

June 1984

**Errata Sheet
for**

2500 and 2503 Series Level-Trol[®] Controller/Transmitters
Instruction Manual
Form 1013, July 1980

The following additions and corrections are to be made to this instruction manual:

- o Throughout the manual, any reference to a 249 Series sensor also includes the Type 249A, 249AB, and 249AC sensor with displacer mounted in cage outside vessel as well as the Type 249ABP, 249ACP, or 249AP top-mounted cageless sensor with displacer hanging down into vessel. However, any reference to a right-hand mounting position does not apply to the 249A Series sensors.
1. On page 2, change the last half of the Liquid Density part of the INPUT SIGNAL specification to read: "...standard volumes are [] 25 in.³ for 249A Series sensors [] 60 in.³ for Type 249C and 49CP sensors or [] 100 in.³ for most other 249 Series and Type 259B sensors; other volumes available depending on construction".
2. On page 2, change the last half of the Ambient Temperature Error part of the PERFORMANCE specification to read: "...when using sensor with standard-wall Hastelloy C torque tube (249A Series sensors) or standard-wall Monel torque tube (249 Series and Type 259B sensors)".
3. On page 4, add the following sentence to the first paragraph after the Installation heading: "Additionally, refer to the Installation section of the appropriate 249A Series sensor manual in applying these installation instructions specifically to a 249A Series sensor with attached 2500 or 2503 Series controller/transmitter."
4. On page 6, add the following sentence to the paragraph in the middle of the right-hand column: "With flanged connections, use standard asbestos gaskets or other flat-sheet gaskets compatible with the process fluid. Spiral wound gaskets without compression-controlling centering rings cannot be used for this purpose."
5. On page 15, replace the second paragraph after the Calibrating procedure heading and the Liquid Level applications, Interface Level Applications, and Density Applications subsections with the following: "Several steps in these calibrating procedures require setting the process variable at its minimum and maximum limits according to the following table--Table 4, Minimum and Maximum Limits for Setting Process Variable."

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Application	Min Limit	Max Limit
Liquid level	Displacer must be completely out of liquid	Displacer must be completely submerged in liquid
Interface	Displacer must be completely submerged in lighter of two process liquids	Displacer must be completely submerged in heavier of two process liquids
Density	Displacer must be completely submerged in liquid having specific gravity of lowest range point	Displacer must be completely submerged in liquid having specific gravity of highest range point

6. On page 16, change the sequence of steps 4 and 5 in the left-hand column in order not to disturb the centering action once it has been completed.
7. On page 21, change the figure 15 title to read: "Heat Insulator Shown Installed on 249 Series or Type 259B Sensor (Also Typical Installation on 249A Series Sensor)."
8. On page 22, change the last two sentences of step 2 in the left-hand column to read: "With a 249 Series or Type 259B sensor, remove the torque tube arm from the sensor or vessel and reinstall the torque tube arm in the opposite position according to the appropriate instruction manual."
9. On page 22, add the following sentence to the CAUTION in the middle of the right-hand column: "With a 249A Series sensor, additionally make sure the ball bearing assembly (key 12, figure 17 or 18) is removed from the case (key 1, figure 17 or 18) to provide tube clearance when installing the case on the sensor."

Items 10 through 21 refer to the Controller/Transmitter parts list on pages 25 and 26.

10. Change Key 1 as follows:

Pilot Case Back, aluminum	57A0953 X012
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11. Change the material in Key 4 from brass to stainless steel.

12. Change Key 16 as follows:

Type 2500 and 2500T	
3 to 15 psig	
Bronze	1C8981 000A2
Stainless steel (corrosive service)	28A9663 X012
6 to 30 psig	
Bronze	1E5703 000A2
Stainless steel (corrosive service)	28A9664 X012

13. Change Key 18 as follows:
- | | |
|--------------------------------|--------------|
| Types 2500T and 2503, aluminum | 1C9903 18992 |
|--------------------------------|--------------|
14. Change Key 19 as follows:
- SUPPLY Gauge
- | | |
|-------------------------------------|--------------|
| 3 to 15 psig range | |
| Brass (standard) | 16A6983 X022 |
| Stainless steel (corrosive service) | 16A6983 X182 |
| 6 to 30 psig range | |
| Brass (standard) | 16A6983 X042 |
| Stainless steel (corrosive service) | 16A6983 X202 |
15. Change Key 20 as follows:
- OUTPUT Gauge
- | | |
|-------------------------------------|--------------|
| 3 to 15 psig range | |
| Brass | 16A6983 X012 |
| Stainless steel (corrosive service) | 16A6983 X172 |
| 6 to 30 psig range | |
| Brass | 16A6983 X032 |
| Stainless steel (corrosive service) | 16A6982 X192 |
16. Change Key 22* as follows:
- Standard, neoprene
to
Standard and corrosive service (2500 and 2500T only), neoprene
17. Change Key 23 as follows:
- | | |
|----------------------|--------------|
| Relay Base, aluminum | 47A9050 X012 |
|----------------------|--------------|
18. Change Key 24* as follows:
- Standard, neoprene
to
Standard and corrosive service (2500 and 2500T only), neoprene
19. Change Key 34 as follows:
- | | |
|---|--------------|
| All except 2503 Series controllers | |
| Standard | 18A5299 X012 |
| High temperature | 18A5300 X012 |
| Corrosive service (2500 and 2500T only) | 18A5299 X032 |
| 2503 Series controllers | |
| Standard | 18A5297 X012 |
| High temperature | 18A5296 X012 |

2500 and 2503 Series

20. Change Key 36 as follows:

PROPORTIONAL BAND Adjustment Ass'y	
2500, 2500S, 2500C, 2500SC (standard	10A9122 X032
and high temperature), brass	
2500 (corrosive service), brass ENC	10A9122 X062

21. Change Key 90 as follows:

SPECIFIC GRAVITY Adjustment Ass'y	
(transmitters only)	
2500T and 2500TC (standard and high	10A8870 X0A2
temperature), brass	
2500T (corrosive service), brass ENC	10A8870 X012

Items 22 through 28 refer to the Relay parts list on page 26.

22. Change Key 83 as follows:

Relay Body	
Aluminum/brass	48A3766 X012
Aluminum/stainless steel	48A3766 X032

23. Change Key 84 as follows:

Spacer Ring, aluminum	38A3778 X012
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24. Change Key 85 as follows:

Casing Ass'y, aluminum/steel	18A3980 X012
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25. Change Key 86* as follows:

Diaphragm Ass'y	
Standard, nitrile	18A2451 X012
High temperature, polyacrylate	18A2451 X022
Corrosive service, nitrile	18A2451 X042

26. Change Key 87 as follows:

Valve plug	
Standard, brass	0Y0617 14012
Corrosive service, stainless steel	0Y0617 X0022

27. Change the material in Key 88* from brass to aluminum/sapphire and in Key 88 from brass to brass, pl.

28. Remove (standard only) from Key 98.

Fisher Controls

Instruction Manual

Class 125 Through 600 Design ED and EAD Valve Bodies

FISHER®

June 1984

Form 5032

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Introduction

Scope of Manual

This instruction manual includes installation, maintenance, and parts information for 1- through 8-inch Design ED valve bodies, and 1-through 6-inch Design EAD valve bodies, through Class 600 ratings. Refer to separate manuals for instructions covering the actuator and accessories.

Description

These single-port valve bodies have cage guiding, quick-change trim, and balanced push-down-to-close valve plug action. Body configurations are as follows:

Design ED—Globe-style body (figure 1) with metal-to-metal seating for all general applications over a wide variety of pressure drops and temperatures.



W1916-2

Figure 1. Design ED Valve Body with Type 667 Actuator

Design EAD—Angle version of Design ED, used to facilitate piping or in applications where a self-draining body is required.

Specifications

Typical specifications for these bodies are shown in table 1. Some of the specifications for a given body assembly as it comes from the factory appear on the actuator nameplate if the body is part of a complete control valve assembly.

Table 1. Specifications

**END CONNECTION
STYLES & RATINGS⁽¹⁾**

Cast Iron Bodies

Flanged: Consistent with Class 125B or 250B per ANSI B16.1-1975

Screwed: Consistent with Class 250B per ANSI B16.1-1975

Steel and Stainless Steel Bodies

Flanged: Consistent with Class 150, 300, and 600⁽²⁾ per ANSI B16.34-1981

Screwed or Socket Welding: Consistent with flanged Class 600 per ANSI B16.34-1981

Buttwelding: Consistent with Class 600 per ANSI B16.34-1981

**SHUTOFF CLASS-
IFICATIONS PER
ANSI/FCI 70-2-1976
(R 1982), FORMERLY
ANSI B16.104-1976**

Standard: Class II⁽³⁾—maximum leakage 0.5 percent of valve capacity at full travel

Optional for Body with Graphite Piston Ring and 3-7/16 Inch (87 mm) or Larger Port Diameter:

**FLOW
CHARACTERISTICS**

FLOW DIRECTIONS

**APPROXIMATE
WEIGHTS**

Class III⁽³⁾—maximum leakage 0.1 percent of valve capacity at full travel

Standard Cages: ■ Linear, ■ quick opening, or ■ equal percentage

Whisper Trim® Cage: Linear

Standard Cages: Normally down
Whisper Trim Cage: Always up

BODY SIZE INCHES	WEIGHT	
	pounds	kg
1/2 & 3/4	25	11
1 & 1-1/4	30	14
1-1/2	45	20
2	67	39
3	125	45
4	170	77
6	350	159
8	900	408

1. The pressure or temperature limits in this manual, and any applicable standard limitations, should not be exceeded.
2. Some flanged Class 600 bodies in 316 stainless steel do not comply with ANSI B16.34-1981.

1981.
3. Test fluid is air at service ΔP or 50 psi (3.4 bar) drop, whichever is lower, and between 50 and 125°F (10 and 52°C).

Installation

WARNING

Personal injury or equipment damage caused by sudden release of pressure may result if the valve assembly is installed where service conditions could exceed the limits given in table 1 or on the appropriate nameplates. To avoid such injury or damage, provide a relief valve for over-pressure protection as required by government or accepted industry codes and good engineering practices.

CAUTION

When ordered, the valve configuration and construction materials were selected to meet particular pressure, temperature, pressure drop, and controlled fluid conditions. Since some body/trim material combinations are limited in their pressure drop and temperature ranges, do not apply any other conditions to the valve without first contacting the Fisher sales office or sales representative.

1. Before installing the valve, inspect the valve body and associated equipment for any damage and any foreign material.

2. Make certain the body interior is clean, that pipelines are free of foreign material, and that the valve is oriented so that pipeline flow is in the same direction as the arrow on the side of the valve body.

3. The control valve assembly may be installed in any orientation unless limited by seismic criteria. However, the normal method is with the actuator vertical above the body. Other positions may result in uneven valve plug and cage wear, and improper operation. With some valves, the actuator may also need to be supported when it is not vertical. For more information, consult the Fisher sales office or sales representative.

4. Use accepted piping and welding practices when installing the valve in the line. Internal elastomeric parts may stay in place during the welding procedure. For flanged bodies, use a suitable gasket between the body and pipeline flanges.

5. With a leak-off bonnet construction, remove the pipe plugs (keys 14 and 16, figure 5) to hook up the leakoff piping. If continuous operation is required during inspection or maintenance, install a three-valve bypass around the control valve assembly.

6. If the actuator and valve are shipped separately, refer to the actuator mounting procedure in the appropriate actuator instruction manual.

Maintenance

Valve parts are subject to normal wear and must be inspected and replaced as necessary. Inspection and maintenance frequency depends on the severity of service conditions. This section includes instructions for packing lubrication, packing maintenance, trim maintenance, and bellows seal replacement. All maintenance operations may be performed with the valve body in the line.

WARNING

Avoid personal injury or damage to property from sudden release of pressure or uncontrolled process fluid. Before starting disassembly:

- Shut off operating lines to the actuator,
- Isolate the valve from the process,
- Release process pressure, and
- Vent the actuator loading pressure.

Note

Whenever a gasket seal is disturbed by removing or shifting gasketed parts, a new gasket should be installed upon reassembly. This is necessary to ensure a good gasket seal since the used gasket may not seal properly.

Packing Lubrication

If a lubricator or lubricator/isolating valve (figure 2) is provided for TFE/asbestos or other packings that require lubrication, it will be installed in place of the pipe plug (key 14, figure 5). Use a good quality silicon-base lubricant. Packing used in oxygen service or in processes with temperatures over 500°F (260°C) should not be lubricated. To operate the lubricator, simply turn the cap screw clockwise to force the lubricant into the packing box. The lubricator/isolating valve operates the same way except the isolating valve must first be opened and then closed after lubrication is completed.

Packing Maintenance

This procedure covers only TFE V-ring and TFE/asbestos packing. Refer to a separate manual for graphite laminate/filament packing if used. Key numbers refer to figure 3 for

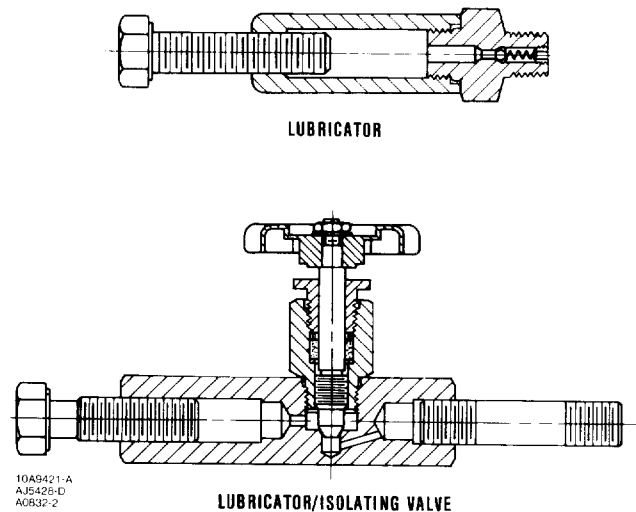


Figure 2. Lubricator and Lubricator/Isolating Valve

TFE V-ring packing and to figure 4 for TFE/asbestos packing unless otherwise indicated.

For spring-loaded single TFE V-ring packing, the spring (key 8, figure 3) maintains a sealing force on the packing. If leakage is noted around the packing follower (key 13, figure 3), check to be sure the shoulder on the packing follower is touching the bonnet. If the shoulder is not touching the bonnet, tighten the packing flange nuts (key 5, figure 5), until the shoulder is against the bonnet. If leakage cannot be stopped in this manner, proceed to the replacing packing procedure.

If there is undesirable packing leakage with other than spring-loaded packing, first try to limit the leakage and establish a stem seal by tightening the packing flange nuts.

If the packing is relatively new and tight on the stem, and if tightening the packing flange nuts does not stop the leakage, it is possible that the valve stem is worn or nicked so that a seal cannot be made. The surface finish of a new valve stem is 4 micro-inches (0.1 μm) rms. If the leakage comes from the outside diameter of the packing, it is possible that the leakage is caused by nicks or scratches around the packing box wall. If performing any of the following procedures, inspect the valve stem and packing box wall for nicks and scratches.

Adding Packing Rings

When using packing with a lantern ring (key 8, figure 3 or 4), it is possible to add packing rings above the lantern ring as a temporary measure without removing the actuator from the valve body.

1. Isolate the control valve from the line pressure, and release pressure from the valve body.

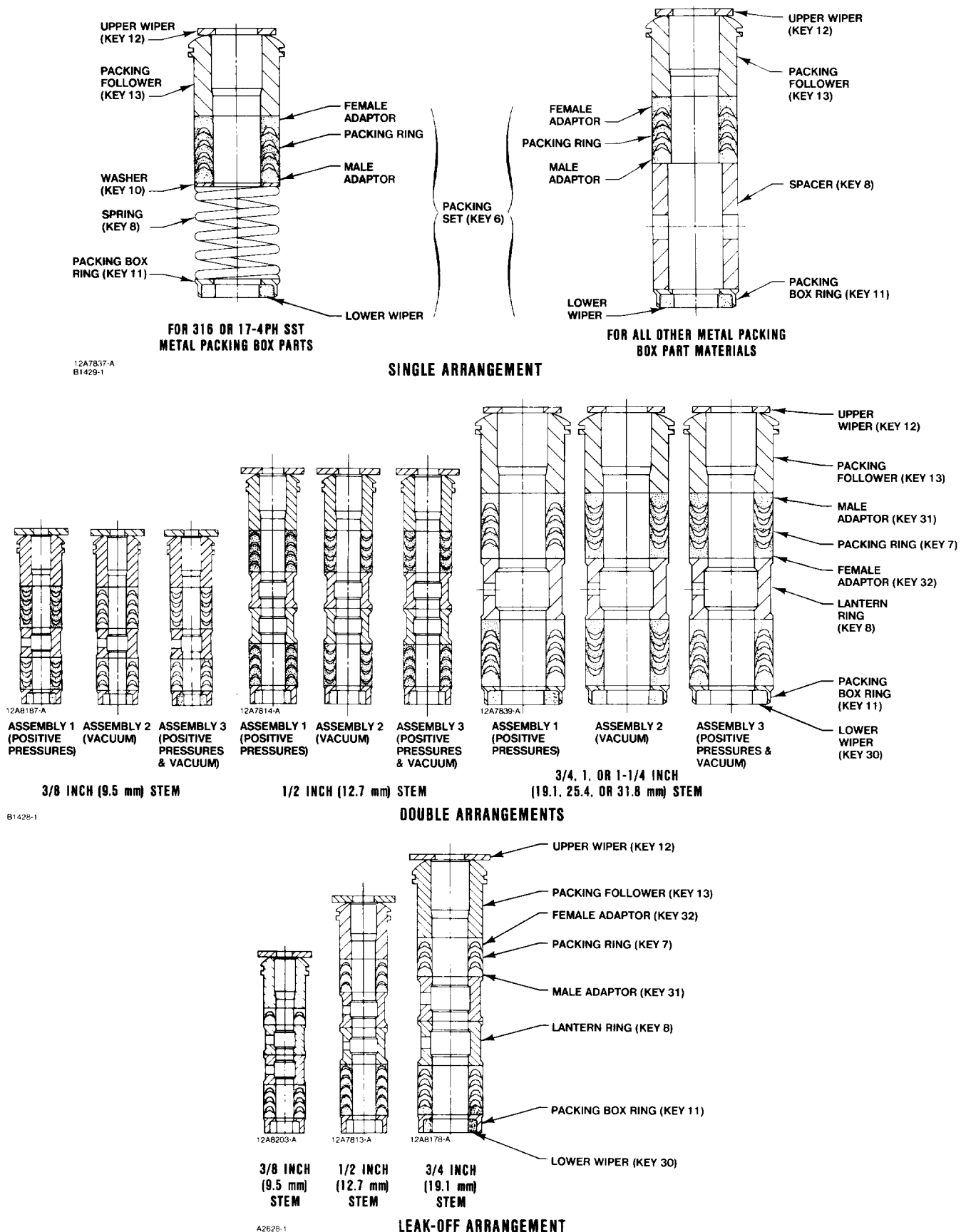


Figure 3. TFE V-Ring Packing Arrangements

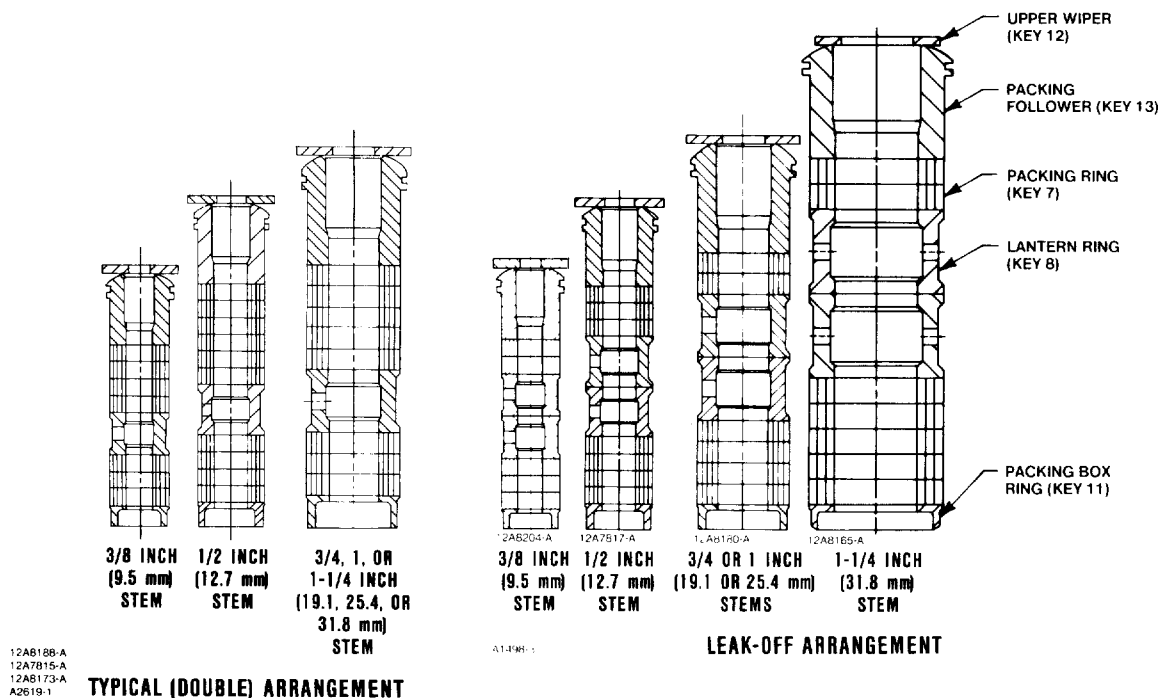


Figure 4. Detail of TFE/Asbestos Packing Arrangements

2. Remove the packing flange nuts (key 5, figure 5) and lift the packing flange and follower (keys 3 and 13, figure 5) away from the valve body.

3. It may be possible to dig out the old packing rings on top of the lantern ring, but use care to avoid scratching the valve stem or packing box wall. Clean all metal parts to remove particles that would prevent the packing from sealing.

4. If split-ring packing is being added, spread the rings over the stem and slide the rings into the packing box. If solid-ring packing is being added, remove the stem connector and slip the rings over the end of the valve stem.

5. Replace the packing flange and packing follower. Tighten the packing flange nuts (key 5, figure 5) only far enough to stop leakage under operating conditions.

6. If the valve/actuator stem connection was taken apart, reconnect according to the appropriate actuator instruction manual.

7. Check for leakage around the packing follower when the valve is being put into service. Retighten the packing flange nuts as required.

Replacing Packing

1. Isolate the control valve from the line pressure, and release pressure from the valve body.

2. Disconnect the operating lines from the actuator and any leak-off piping from the bonnet. Disconnect the stem connector and then remove the actuator from the valve by unscrewing the yoke locknut (key 15, figure 5) or the hex nuts (key 26, figure 5).

3. Loosen the packing flange nuts (key 5, figure 5) so that the packing is not tight on the valve stem. Remove any travel indicator parts and stem locknuts from the valve stem threads.

CAUTION

When lifting the bonnet (key 1, figure 5), be sure that the valve plug and stem assembly remains in the valve and on the seat. This will avoid damage to the seating surfaces as a result of the assembly dropping from the bonnet after being lifted part way out. The parts are also easier to handle separately.

4. Unscrew the cap screws (not shown) or hex nuts (key 16, figure 6, 8 or 9) that bolt the bonnet and body together and carefully lift the bonnet off the valve stem. If the valve has a bellows seal bonnet, separate the bonnet from the bellows seal adaptor (key 17, figure 5).

5. If the valve plug and stem assembly starts to lift with the bonnet, use a brass or lead hammer on the end of the stem and tap it back down. Set the bonnet on a protective surface to prevent damage to the bonnet gasket surface.

Table 2. Body-to-Bonnet Bolt Torque Guidelines

BODY SIZE, INCHES		BOLT TORQUES ⁽¹⁾			
Design ED	Design EAD	Field-Lubricated Bolting		Stud Bolt Nuts Factory Prelubricated w/Molykote ⁽²⁾ 321R Dry Film Lubricant	
		Ft-Lb	N•m	Ft-Lb	N•m
1-1/4 or less	1	100	136	65	88
1-1/2, 1-1/2 x 1, 2, or 2 x 1	2 or 2 x 1	80	108	50	68
2-1/2 or 2-1/2 x 1-1/2	3 or 3 x 1-1/2	100	136	65	88
3, 3 x 2, or 3 x 2-1/2	4 or 4 x 2	130	176	85	115
4, 4 x 2-1/2, or 4 x 3	6 or 6 x 2-1/2	190	258	135	183
6	---	400	542	300	407
8	---	540	732	---	---

1. Determined from laboratory tests.
2. Trademark of Dow Corning Corporation.

6. Remove the bonnet gasket (key 10, figure 6 through 9) and cover the opening in the valve body to protect the gasket surface and prevent foreign material from getting into the body cavity.

7. Remove the packing flange nuts (key 5, figure 5), packing flange (key 3, figure 5), upper wiper (key 12, figure 5), and packing follower (key 13, figure 5). Carefully push out all the remaining packing parts from the body side of the bonnet using a rounded rod or other tool that will not scratch the packing box wall. Clean the packing box and the metal packing parts.

8. Inspect the valve stem threads and packing box surfaces for any sharp edges which might cut the packing. Scratches or burrs could cause packing box leakage or damage to the new packing. If the surface condition cannot be improved by light sanding, replace the damaged parts by following the appropriate steps in the trim maintenance procedure.

9. Remove the covering protecting the body cavity and install a new bonnet gasket (key 10, figure 6 through 9), making sure the gasket seating surfaces are clean and smooth. Then slide the bonnet over the stem and onto the stud bolts (key 16, figure 6, 8, or 9) or onto the body cavity if cap screws (not shown) will be used instead.

Note

Proper performance of the bolting procedures in step 10 compresses the spiral wound gasket (key 12, figure 6 through 8) or load ring (key 26, figure 9) enough to both load and seal the seat ring gasket (key 13, figure 6, 8, or 9). It also compresses the outer edge of the bonnet gasket (key 10, figure 6 through 9) enough to seal the body-to-bonnet joint.

The prelubricated stud bolt nuts (key 16, figure 6, 8, or 9) referred to in step 10 can be identified by a black film coating on the nut threads.

The proper bolting procedures in step 10 include—but are not limited to—ensuring that bolting threads are clean, and evenly tightening the cap screws, or the nuts onto the studs, in a crisscross pattern. Because of the boltup characteristics of spiral wound gaskets, tightening one cap screw or nut may loosen an adjacent cap screw or nut. Repeat the criss-cross tightening pattern several times until each cap screw or nut is tight and the body-to-bonnet seal is made. When the operating temperature has been reached, perform this torquing procedure once again.

10. Lubricate the bolting (not necessary if factory pre-lubricated stud bolt nuts are used) and install it, using proper bolting procedures during tightening so that the body-to-bonnet joint will withstand test pressures and application service conditions. The bolt torques in table 2 may be used as guidelines.

11. Install new packing and the metal packing box parts according to the appropriate arrangement in figure 3, 4, or 5. Place a smooth-edged pipe over the valve stem and gently tap each soft packing part into the packing box, being sure that air is not trapped between adjacent soft parts.

12. Slide the packing follower (key 13, figure 5), upper wiper (key 12, figure 5), and packing flange (key 3, figure 5) into position. Lubricate the packing flange studs (key 4, figure 5) and the faces of the packing flange nuts (key 5, figure 5). Install the packing flange nuts.

13. For spring-loaded TFE V-ring packing, tighten the packing flange nuts until the shoulder on the packing follower (key 13, figure 5) contacts the bonnet.

For other packing types, tighten the packing flange nuts according to proper bolting procedures.

14. Mount the actuator on the valve body assembly and reconnect the actuator and valve stem according to the procedure in the appropriate actuator instruction manual.

Trim Maintenance

Disassembly

Except where indicated, key numbers in this section are referenced in figure 6 for standard 1-through 6-inch constructions, figure 7 for FGM gasket sets, figure 8 for Whisper Trim III detail, and figure 9 for the 8-inch Design ED body.

1. Remove the actuator and the bonnet according to steps 1 through 5 of the replacing packing procedure.

CAUTION

When lifting the valve plug stem (key 7) and attached valve plug (key 2) out of the body, be certain that the cage (key 3) remains in the body (key 1). This will prevent cage damage that might be caused by the cage dropping back into the body after being lifted part way out.

Use care to avoid damaging gasket sealing surfaces.

The graphite piston ring (key 6) in a Design ED or EAD body is brittle and in two pieces. Use care to avoid damage to the piston rings caused by dropping or rough handling.

The surface finish of the valve stem (key 7) is critical for making a good packing seal. The inside surface of the cage or cage/baffle assembly (key 3), or cage retainer (key 31), is critical for smooth operation of the valve plug and for making a seal with the piston ring (key 6). The seating surfaces of the valve plug (key 2) and seat ring (key 9) are critical for tight shutoff. Assume all these parts are in good condition and protect them accordingly unless inspection reveals otherwise.

2. Packing parts can be removed if desired. Replace these parts as described in the replacing packing procedure. Remove the load ring (key 26) from an 8-inch Design ED body, or the cage adaptor (key 4) from any restricted-trim body through 4 inches, and wrap it for protection.

3. Lift the valve plug and stem assembly out of the valve body and set it on a protective surface. If the valve plug is to be reused, protect the valve plug seating surface to prevent scratches. On a 6-inch Design ED body with Whisper Trim III cage, also remove the bonnet spacer (key 32), the bonnet gasket (key 10) on top of the spacer, and the cage retainer (key 31) and its associated gaskets. The cage retainer has two 3/8-inch-16 NPT tappings in which screws or bolts can be installed for lifting.

4. Remove the cage or cage/baffle assembly (key 3) and the associated gaskets (keys 10, 11, and 12). With full-capacity constructions that have FGM gasket sets, a shim (key 51 for the Design ED body, key 27 for the Design EAD body) is used instead of the cage gasket (key 11). If the cage is stuck in the body, use a rubber mallet to strike the exposed portion of the cage at several points around its circumference.

5. Remove the seat ring or liner (key 9), seat ring gasket (key 13), and the seat ring adaptor (key 5) and adaptor gasket (key 14) where used in a restricted-capacity construction.

6. Inspect parts for wear or damage which would prevent proper operation of the valve. Replace or repair trim parts according to the following procedures for lapping seating surfaces or other valve plug maintenance procedures as appropriate.

Lapping Seating Surfaces

Seating surfaces of the valve plug and seat ring or liner, (keys 2 and 9, figure 6, 8, or 9) can be lapped for improved shutoff. (Deep nicks should be machined out rather than ground out.) Use a commercial lapping compound or a mixture of 600-grit carborundum and solidified vegetable oil. Assemble the valve to the extent that the cage, and cage retainer and bonnet spacer if used, is in place and the bonnet is bolted to the body. A simple handle can be made from a piece of strap iron locked to the valve plug stem with nuts. Rotate the handle alternately in each direction to lap the seats. After lapping, remove the bonnet and clean the seat surfaces. Completely assemble as described in the assembly portion of the trim maintenance procedure and test the valve for shutoff. Repeat the lapping procedure if leakage is still excessive.

Table 3. Valve Stem Connection Bolt Torque and Groove Pin Replacement

VALVE STEM CONNECTION (VSC)		BOLT TORQUE, MINIMUM TO MAXIMUM		DRILL SIZE, INCH
Inch	mm	Foot pound-force	N • m	
3/8	9.5	25 to 35	40 to 47	3/32
1/2	12.7	60 to 85	81 to 115	1/8
3/4	19.1	175 to 250	237 to 339	3/16
1	25.4	310 to 355	420 to 481	1/4
1-1/4	31.8	610 to 670	827 to 908	1/4

Valve Plug Maintenance

Except where indicated, key numbers in this section are referenced in figure 6 for standard 1- through 6-inch constructions, figure 8 for Whisper Trim III detail, and figure 9 for the 8-inch Design ED body.

CAUTION

If replacing the piston ring (key 6), be careful not to scratch the surfaces of the ring groove in the valve plug or any of the surfaces of the replacement ring, or the replacement ring may not seal properly.

1. With the valve plug (key 2) removed according to the disassembly portion of the Trim Maintenance procedure, proceed as appropriate:

For the carbon-filled TFE piston ring, the ring is split in one place. If there is visible damage, spread the ring slightly and remove it from the groove in the valve plug.

To install a carbon-filled TFE piston ring, spread the ring apart slightly at the split and install it over the stem and into the groove in the valve plug. The open side must face along the stem, depending on flow direction, as shown in view A of figure 6.

For the graphite piston ring, the ring can be easily removed since it is in two pieces. A new graphite piston ring is furnished as a complete ring and must be broken into two approximately equal portions. Do this by placing the ring horizontally in a vise and applying pressure until the ring snaps. An alternate method is to place the ring on edge on a smooth, hard surface and strike the ring squarely with a hammer. Be sure to match the broken ends when installing the ring in the valve plug groove.

CAUTION

Never reuse an old stem or connection stud with a new valve plug. Using an old stem or stud with a new plug requires drilling a new groove pin hole in the stem (or stud in case a

bellows seal bonnet is being used). This weakens the stem or stud and may cause it to fail in service. However, a used valve plug may be re-used with a new stem or stud.

2. To replace the valve stem (key 7), or connection stud (key 24, figure 5) drive out the groove pin (key 8) and unscrew the stem or stud from the valve plug.

3. Screw the new stem or stud into the valve plug. Tighten to the torque value given in table 3. Refer to table 3 to select the proper drill size. Drill through the stem or stud, using the hole in the valve plug as a guide. Remove any chips or burrs and drive in a new groove pin to lock the assembly. On a bellows seal bonnet assembly, thread the new stem into the stud.

Assembly

Except where indicated, key numbers in this section are referenced in figure 6 for standard 1- through 6-inch constructions, figure 7 for FGM gasket sets, figure 8 for Whisper Trim III detail, and figure 9 for the 8-inch Design ED body.

1. With a restricted-capacity construction, install the adaptor gasket (key 14) and seat ring adaptor (key 5).

2. Install the seat ring gasket (key 13), and seat ring or liner (key 9).

3. Install the cage or cage/baffle assembly (key 3). Any rotational orientation of the cage or assembly with respect to the body is acceptable. A Whisper Trim III cage designated by level A3, B3, or C3 may be installed with either end up. The level D3 cage/baffle assembly, however, must be installed with the hole pattern end next to the seat ring. If a cage retainer (key 31) is to be used, place it on top of the cage.

4. Slide the valve plug (key 2) and stem assembly, or valve plug and bellows seal assembly, into the cage. Make sure the piston ring (key 6) is evenly engaged in the entrance chamfer at the top of the cage (key 3) or cage retainer (key 31) to avoid damaging the ring.

5. Place the gaskets (keys 12, 11 or 14 if used, and 10) and the shim (key 27 or 51), if used, on top of the cage or cage retainer. If there is a cage adaptor (key 4) or a bonnet spacer (key 32), set it on the cage or cage retainer gaskets and place another flat sheet gasket (key 10) on top of the adaptor or spacer. If there is only a cage retainer, place another flat sheet gasket on the retainer.

6. With an 8-inch Design ED body, install the load ring (key 26).

CAUTION

If the packing is to be reused and was not removed from the bonnet, use care when installing the bonnet to avoid damaging the packing with the valve stem threads.

7. Mount the bonnet on the body and complete assembly according to steps 10 through 14 of the replacing packing procedure, omitting steps 11 and 12 if new packing is not being installed, and being sure to observe the note prior to step 10.

Bellows Seal Replacement**CAUTION**

On bellows seal bonnets, the stem must not be rotated, or damage to the bellows will result.

Refer to figure 5 except where indicated.

1. Remove the actuator and bonnet according to steps 1 through 5 of the replacing packing procedure.

2. Screw the stem locknuts onto the valve plug stem and lock the nuts together. Hold a wrench on the flats of the shaft extending out the top of the bellows seal assembly (key 20) and use a wrench on the stem locknuts to unscrew the valve plug stem from the bellows seal assembly. Then remove the cap screws (key 23) from the bellows seal adaptor (key 17), and unscrew the bellows seal assembly from the connection stud (key 24).

3. Install the replacement bellows seal assembly by screwing it onto the connection stud. Make sure that the new gaskets (key 21), anti-rotator (key 18), and the travel stop (key 19) are in place.

4. Bolt the bellows seal assembly to the bellows seal adaptor with cap screws.

5. Hold a wrench on the flats of the shaft extending out the top of the bellows seal assembly and screw the valve plug stem into the shaft.

6. Install all new gaskets between the bellows seal adaptor and the body and between the bellows seal adaptor and the bonnet.

7. Mount the bonnet on the body and complete assembly according to steps 10 through 14 of the replacing packing procedure, omitting steps 11 and 12 if new packing is not being installed.

Parts Ordering

Each body-bonnet assembly is assigned a serial number which can be found on the body. This same number also appears on the actuator nameplate when the body is shipped from the factory as part of a control valve assembly. Refer to the serial number when contacting your Fisher representative for technical assistance. When ordering replacement parts, refer to the serial number and to the 11-character part number for each part required from the following parts list.

Parts List**Repair Kits****Note**

Kits include keys 6, 8, 10, 11, and 12. Kits do not apply to Hastelloy, alloy 20 or Monel trims. The kits include encapsulated fiber asbestos gasket sets and TFE packing sets with packing box parts.

Key	Description	Part Number
	2-1/2 inch (3 inch EAD)	REX00000M42
	3 inch (4 inch EAD)	REX00000M52
	4 inch (6 inch EAD)	REX00000M62
	6 inch	REX00000M72
	8 inch	REX00000M82

Restricted Capacity Valve Bodies

Key	Description	Part Number
	With metal seating	
	1-1/2 x 1 inch (2 x 1 inch EAD)	REX00000MA2
	2 x 1 inch	REX00000MB2
	2-1/2 x 1-1/2 inch (3 x 1-1/2 inch EAD)	REX00000MC2
	3 x 2 inch (4 x 2 inch EAD)	REX00000MD2
	4 x 2-1/2 inch (6 x 2-1/2 inch EAD)	REX00000ME2
	6 x 4 inch	REX00000MF2

Full Capacity Valve Bodies

Key	Description	Part Number
	With metal seating	
	1 & 1-1/4 inch	REX00000M12
	1-1/2 inch (2 inch EAD)	REX00000M22
	2 inch	REX00000M32

Bonnet (figures 3-5)

Key	Description	Part Number	Key	Description	Part Number
			4	Packing Flange Stud, steel (2 req'd) 3/8-inch (9.5 mm) stem 1/2-inch (12.7 mm) stem 3/4-inch (19.1 mm) stem 1-inch (25.4 mm) stem 1-1/4 inch (31.8 mm) stem	1E9441 31032 1E9444 31032 1E9449 31032 OV0025 31032 OW0869 31032
3	Packing Flange, steel 3/8-inch (9.5 mm) stem 1/2-inch (12.7 mm) stem 3/4-inch (19.1 mm) stem 1-inch (25.4 mm) stem 1-1/4 inch (31.8 mm) stem	1E9437 24102 1E9442 23072 1E9448 23072 OV0024 25052 OW0856 25052	5	Packing Flange Nut, steel (2 req'd) 3/8-inch (9.5 mm) stem 1/2-inch (12.7 mm) stem 3/4-inch (19.1 mm) stem 1-inch (25.4 mm) stem 1-1/4 inch (31.8 mm) stem	1E9440 24112 1E9445 24112 1E9446 24112 1A3433 24112 1A3681 24112
			11	Packing Box Ring 3/8-inch (9.5 mm) stem, 316 stainless steel 1/2-inch (12.7 mm) stem, 316 stainless steel 3/4-inch (19.1 mm) stem, 316 stainless steel 1-inch (25.4 mm) stem, 17-4PH stainless steel 1-1/4-inch (31.8 mm) stem, 17-4PH stainless steel	1J8731 35072 1J8732 35072 1J8733 35072 1J8734 35012 1J8735 35012

Key 1 Plain bonnet, cast iron

BODY SIZE, INCHES		YOKE BOSS DIAMETER		PART NUMBER
Design ED	Design EAD	Inches	mm	
1 or 1-1/4	1	2-1/8 2-13/16	54 71	2R2820 19022 2R2821 19022
1-1/2 or 1-1/2 x 1-1/2	2 or 2 x 1	2-1/8 2-13/16	54 71	2R3112 19022 2R3113 19022
2 or 2 x 1	---	2-13/16 3-9/16	71 90	2R3310 19022 2R3311 19022
2-1/2 or 2-1/2 x 1-1/2	3 or 3 x 1-1/2	2-13/16 3-9/16	71 90	2R3856 19022 2R3857 19022
3 or 3 x 2	4 or 4 x 2	2-13/16 3-9/16	71 90	2R3493 19022 2R3494 19022
4 or 4 x 2-1/2	6 or 6 x 2-1/2	2-13/16 3-9/16 5 ⁽¹⁾	71 90 127 ⁽¹⁾	2R3673 19022 2R3674 19022 2R3675 19022
6 or 6 x 4	---	3-9/16 5 ⁽¹⁾ 5 ⁽²⁾	90 127 ⁽¹⁾ 127 ⁽²⁾	3U5096 19022 2U5101 19022 2U5102 19022
8	---	3-9/16	90	30A3272 X012

1. 1-inch (25.4 mm) stem.
2. 1-1/4 inch (31.8 mm) stem.

Key 1 Bonnet, steel

BODY SIZE, INCHES		YOKE BOSS DIAMETER		PART NUMBER					
Design ED	Design EAD	Inches	mm	Plain	Style 1 Extension		Style 2 Extension		Bellows Seal
					Tapped Boss	Untapped Boss	Tapped Boss	Untapped Boss	
1 or 1-1/4	1	2-1/8 2-13/16	54 71	2R2814 23022 2R2813 22012	2R2826 22012 2R2827 22012	2R2736 22012 2R2852 22012	3R2865 22012 3R2866 22012	3R2884 22012 3R2922 22012	3R2893 22012 3R2894 22012
1-1/2 or 1-1/2 x 1	2 or 2 x 1	2-1/8 2-13/16	54 71	2R3107 23022 2R3106 22012	2R3118 22012 2R3119 22012	2R3124 22012 2R3127 22012	3R3122 22012 3R3123 22012	3R3059 22012 3R3060 22012	3R3126 22012 3R3128 22012
2 or 2 x 1	---	2-13/16 3-9/16	71 90	2R3305 23022 2R3304 22012	2R3315 22012 ---	2R3321 22012 ---	3R3317 22012 ---	3R3322 22012 ---	3R3319 22012 ---
2-1/2 or 2-1/2 x 1-1/2	3 or 3 x 1-1/2	2-13/16 3-9/16	71 90	2R3853 23022 2R3852 22012	2R3860 22012 2R3862 22012	2R3861 22012 2R3863 22012	3R3864 22012 ---	3R3865 22012 ---	3R3867 22012 ---
3 or 3 x 2	4 or 4 x 2	2-13/16 3-9/16	71 90	2R3490 23022 2R3489 22012	2R3497 22012 2R3499 22012	2R3498 22012 2R3500 22012	3R3502 22012 ---	3R3503 22012 ---	3R3504 22012 ---
4 or 4 x 2-1/2	6 or 6 x 2-1/2	2-13/16 3-9/16 5 ⁽¹⁾	71 90 127 ⁽¹⁾	2R3669 23022 2R3667 22012 2R3668 22012	2R3200 22012 2R3202 22012 ---	2R3678 22012 2R3680 22012 ---	3R3685 22012 3R3687 22012 ---	3R3684 22012 3R3686 22012 ---	3R3688 22012 3R3689 22012 ---
6 or 6 x 4	---	3-9/16 5 ⁽¹⁾ 5 ⁽²⁾	90 127 ⁽¹⁾ 127 ⁽²⁾	3U5094 23022 2U5098 22012 2U5099 22012	3U5105 22012 3U5107 22012 3U5109 22012	3U5104 22012 3U5108 22012 3U5110 22012	2U5112 22012 ---	2U5113 22012 ---	2U5114 22012 ---
8	---	3-9/16 5 ⁽¹⁾ 5 ⁽²⁾	90 127 ⁽¹⁾ 127 ⁽²⁾	30A5471 X012 --- ---	30A3279 X012 30A3280 X012 30A3281 X012	30A3270 X012 30A3274 X012 30A3275 X012	---	---	---

1. 1-inch (25.4 mm) stem.
2. 1-1/4 inch (31.8 mm) stem.

Key	Description	Part Number	Key	Description	Part Number	Key	Description	Part Number
13	Packing Following, 316 stainless steel (Continued) 1-1/4 inch (31.8 mm) stem	1H9984 35072	16	Pipe Plug for 1/2-inch NPT tapped extension and bellows seal bonnets, steel	1A3692 24092	25	Cap Screw for 5-inch (127 mm) yoke boss, steel (8 req'd)	1A9362 24052
14	Pipe Plug, for 1/4-inch NPT tapping in packing box, steel	1A7675 24662	17	Bellows Seal Adaptor, steel 1 & 1-1/4 inch Design ED or 1 inch Design EAD body	1R2882 24492	26	Hex Nut for 5-inch (127 mm) yoke boss, steel (8 req'd)	1A3433 24122
14	Lubricator, steel/440 stainless steel	0V0873 000A2		1-1/2 inch Design ED or 2 inch Design EAD body	1R3130 24492	27	Pipe Nipple for lubricator/isolating valve, steel	1D2397 26232
14	Lubricator/Isolating Valve, Cd pl steel	AJ5428 000A2		2-inch Design ED body	1R3356 24492	28	Warning Plate for bellows seal bonnet, stainless steel	1E5174 36022
15	Yoke Locknut, steel			2-1/2 inch Design ED or 3-inch Design EAD body	1R3872 24492	29	Drive Screw for bellows seal bonnet, stainless steel (2 req'd)	1A3682 28982
	2-1/8 inch (54 mm) yoke boss	1E7930 23062		3-inch Design ED or 4-inch Design EAD body	1R3509 24492			
	2-13/16 inch (71 mm) yoke boss	1E8074 23062		4-inch Design ED, or 6 inch Design EAD body	2R3698 24492			
	3-9/16 inch (90 mm) yoke boss	1E8327 23062		6-inch Design ED body	2U5115 24492			

Key 2 Extension Bonnet Baffle, steel (not required w/8-inch Design ED)

BODY SIZE, INCHES		STEM DIAMETER		STYLE 1 EXTENSION	STYLE 2 EXTENSION
Design ED	Design EAD	Inches	mm		
1, 1-1/4, 1-1/2, or 1-1/2 x 1	1, 2, or 2 x 1	3/8 1/2	9.5 12.7	10A2910 X012 10A2909 X012	10A2910 X012 10A2909 X012
2 or 2 x 1	---	1/2 3/4	12.7 19.1	10A2909 X012 1R3518 24492	1R3360 24492 1R3518 24492
2-1/2, 2-1/2 x 1-1/2, 3, or 3 x 2	3, 3 x 1-1/2, 4, or 4 x 2	1/2 3/4	12.7 19.1	10A2908 X012 1R3518 24492	1R3360 24492 ---
4 or 6 x 4	6 or 6 x 2-1/2	1/2 3/4 1	12.7 19.1 25.4	10A2908 X012 1R3518 24492 1U5676 24492	1R3586 24492 1R3713 24492 10A2986 X012
6	---	3/4 1 1-1/4	19.1 25.4 31.8	1R3518 24492 1U5676 24492 1U5278 24492	1U7632 24492 --- ---

Keys 6*, 7*, 8, 10, 30*, 31*, and 32* Packing Box Parts

DESCRIPTION		KEY NO.	STEM DIAMETER, INCHES (mm)				
			3/8 (9.5)	1/2 (12.7)	3/4 (19.1)	1 (25.4)	1-1/4 (31.8)
TFE V-Ring Packing	Single packing set, TFE	6	1R2900 01012	1R2902 01012	1R2904 01012	1R2906 01012	1R2908 01012
	Packing Ring, TFE	7	1C7526 01012	1C7527 01012	1C7528 01012	1C7529 01012	1D3876 01012
	Quantity required	---	3	3	3	3	3
	Single	---	5	6	6	6	6
	Double	---	2	6	5	---	---
	Leak-off	---					
	Lower Wiper, TFE	30	1J8721 06992	1J8722 06992	1J8723 06992	1J8724 06992	1J8725 06992
	Male Adaptor, TFE (1 required for single or 2 required for double or leak-off)	31	1F1248 01012	1F1247 01012	1F1246 01012	1H9825 01012	1H9957 01012
	Female Adaptor, TFE (1 required for single or 2 required for double or leak-off)	32	1F1244 01012	1F1243 01012	1F1242 01012	1H9824 01012	1H9958 01012
	Spring, stainless steel (for single only)	8	1F1254 37012	1F1255 37012	1F1256 37012	1D5829 37012	1D3874 37012
TFE/asbestos Packing	Lantern Ring, stainless steel (for double or leak-off only)	8	1F3641 35072	1J9623 35072	0N0284 35072	0U0997 35072	0W0871 35072
	Quantity required	---	1	2	1	1	1
	Double	---	2	2	2	---	---
	Leak-off	---					
	Special washer, stainless steel (for single only)	10	1F1252 36042	1F1251 36042	1F1250 36042	1H9822 36042	1H9959 36042
TFE/asbestos Packing	Packing Ring, TFE/asbestos	7	1F3370 X0012	1E3190 01042	1E3191 01042	1D7518 X0012	1D7520 X0012
	Quantity required	---	7	10	8	8	8
	Double	---	5	7	6	6	7
	Leak-off	---					
	Lantern Ring, stainless steel (1 required for double or 2 required for leak-off)	8	1F3641 35072	1J9623 35072	0N0284 35072	0U0997 35072	0W0871 35072

*Recommended spare part.



Keys 18, 19, 20, and 23 Bellows Seal Bonnet Metal Parts

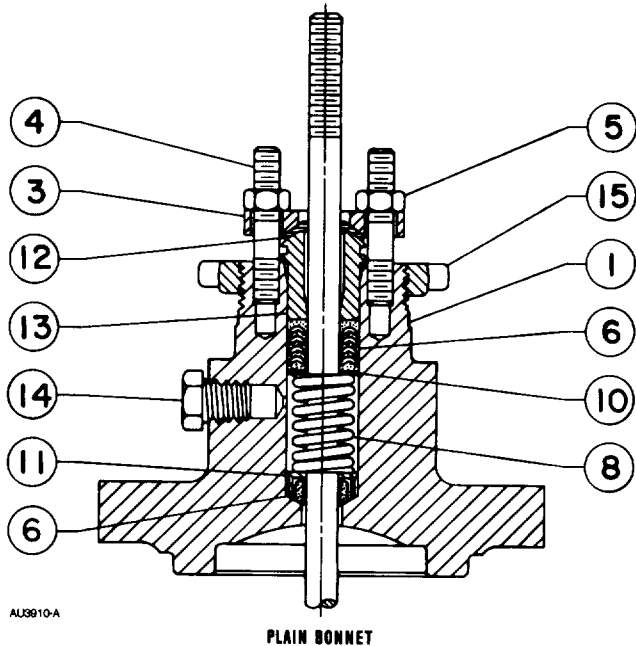
BODY SIZE, INCHES		KEY 18 ANTI-ROTATOR		KEY 19 TRAVEL STOP, 316 STAINLESS STEEL	KEY 20 BELLOWS SEAL ASS'Y STAINLESS STEEL	KEY 23 CAP SCREW, STEEL (4 REQ'D)
Design ED	Design EAD	For 416 Stainless Steel Trim, 17-4PH Stainless Steel	For 316 Stainless Steel Trim, 316 Stainless Steel			
1, 1-1/4, 1-1/2, or 1-1/2 x 1	1, 2, or 2 x 1	1R2875 35012	1R2875 35072	1R2872 35072	1R2881 000A2	1A4078 24052
2, 2 x 1, 2-1/2, 2-1/2 x 1-1/2, 3, or 3 x 2	3, 3 x 1-1/2, 4, or 4 x 2	1R3362 35012	1R3362 35072	1R3359 35072	2R3368 000A2	1A3816 24052
4, 6 x 4, or 6	6 or 6 x 2-1/2	1R3702 35012	1R3702 35072	1R3701 35072	2R3705 000A2	1A3449 24052

Keys 21* and 22* Bellows Seal Bonnet Gaskets

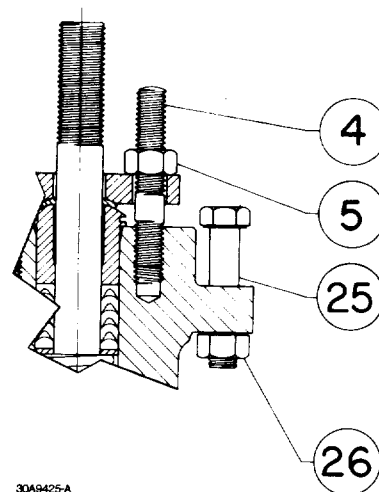
BODY SIZE, INCHES		KEY 21 ANTI-ROTATOR GASKET (2 REQUIRED)		KEY 22 BONNET GASKET	
Design ED	Design EAD	To 800°F (427°C) Asbestos	Over 800°F (427°C) Laminated Graphite	To 800°F (427°C) Asbestos	Over 800°F (427°C) Laminated Graphite
1 or 1-1/4	1	1R2877 04022	1R2877 04262	1R2891 04022	1R2891 04262
1-1/2 or 1-1/2 x 1	---	1R2877 04022	1R2877 04262	1R3101 04022	1R3101 04262
2 or 2 x 1	2 or 2 x 1	1R3363 04022	1R3363 04262	1R3299 04022	1R3299 04262
2-1/2 or 2-1/2 x 1-1/2	3 or 3 x 1-1/2	1R3363 04022	1R3363 04262	1R3847 04022	1R3847 04262
3 or 3 x 2	4 or 4 x 2	1R3363 04022	1R3363 04262	1R3484 04022	1R3484 04262
4 or 6 x 4	6 or 6 x 2-1/2	1R3703 04022	1R3703 04262	1R3724 04022	1R3724 04262
6	---	1R3703 04022	1R3703 04262	1U5081 04022	1U5081 04262

Key 24 Bellows Seal Bonnet Connection Stud, 316 stainless steel

BODY SIZE, INCHES		VSC SIZE		PART NUMBER
Design ED	Design EAD	Inches	mm	
1, 1-1/4, or 1-1/2	1, 2	3/8	9.5	1U2181 46182
		1/2	12.7	1U2182 35072
1-1/2 x 1	2 x 1	3/8	9.5	1U7399 35072
2 or 2 x 1	---	1/2	12.7	1U2268 35072
2-1/2 or 3	3 or 4	1/2	12.7	1U2311 35072
2-1/2 x 1-1/2 or 3 x 2	3 x 1-1/2 or 4 x 2	1/2	12.7	1U2268 35072
4, 4 x 2-1/2, 6, or 6 x 4	6 or 6 x 2-1/2	3/4	19.1	1U2217 35072

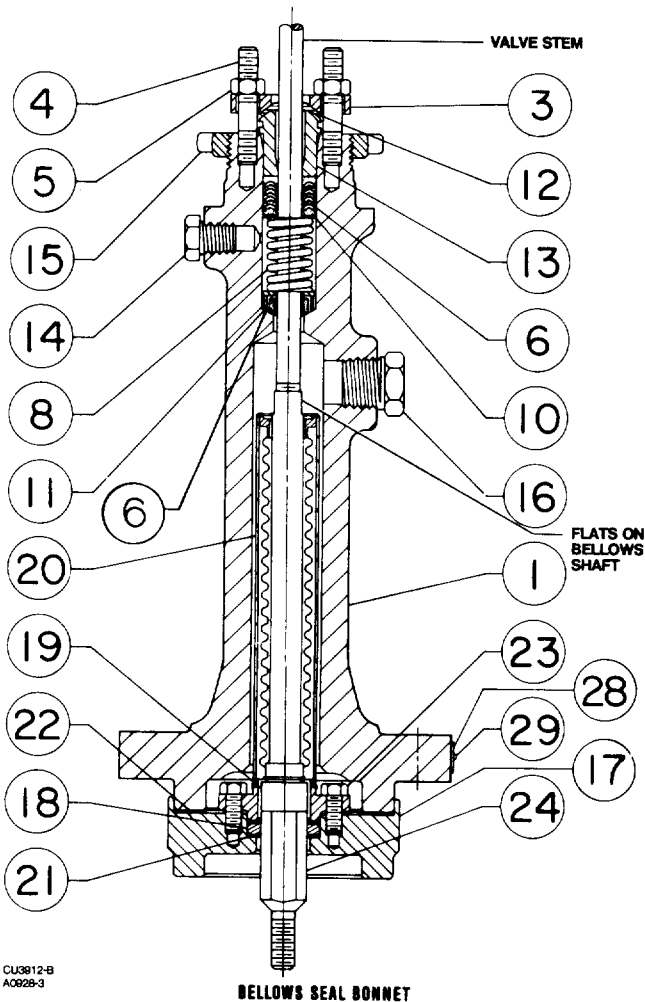


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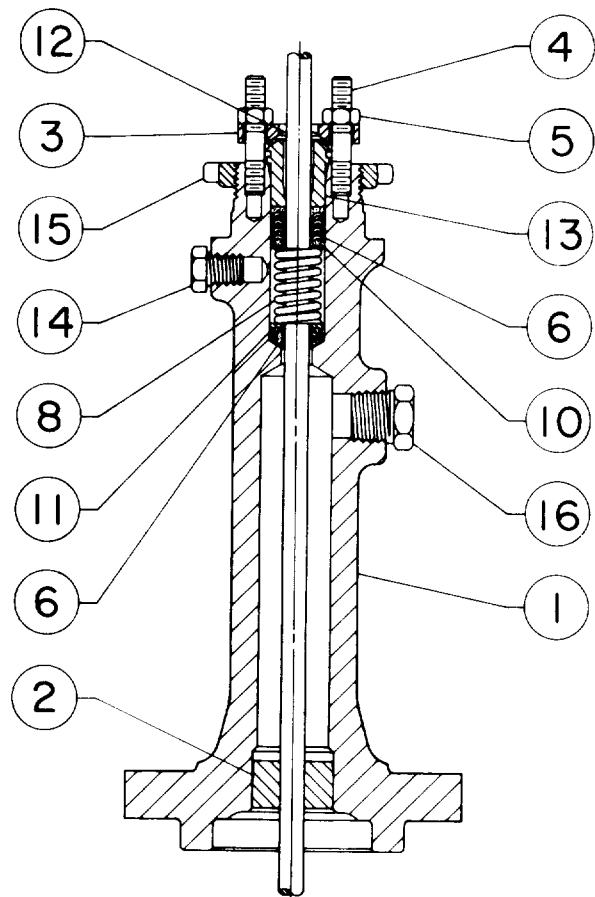


30A9425-A

DETAIL OF 5 INCH (127 mm) YOKE
BOSS ACTUATOR BOLTING



CU3812-B
A0828-3



CU3811-C

STYLE 1 OR 2 EXTENSION
BONNET WITH DOUBLE TAPPING

Figure 5. Typical Bonnets Shown with Single TFE V-Ring Packing Set

125-600 Designs ED & EAD

Body (figures 6-9)

Body (figures 6-9)			Key	Description	Part Number	Key	Description	Part Number
			26	Load Ring (8-inch Design ED only) —150°F (–101°C) to 600°F (316°C) 17-4PH stainless steel 20A3267 X012 —425°F (–254°C) to 1100°F (593°C) Inconel ⁽¹⁾ 718 20A3267 X022 —400°F (–240°C) to 500°F (260°C) corrosive service, K-Monel ⁽¹⁾ 20A3268 X012		31	Whisper Trim III Cage Retainer & Baffle Ass'y for Level D3 (6-inch Design ED only) 410 stainless steel retainer & steel baffle 22A3258 X012 WCB steel (ENC) retainer & steel baffle 22A3258 X022 316 stainless steel (ENC) retainer & steel baffle 22A3258 X052 316 stainless steel w/Alloy 6 (CoCr-A) bore retainer & steel baffle 22A3258 X032 316 stainless steel (ENC) retainer & 316 stainless steel baffle 22A3258 X042 316 stainless steel (electrolized) retainer & 316 stainless steel baffle 22A3258 X062	
Key	Description	Part Number						
8*	Groove Pin, 316 stainless steel 3/8-inch (9.5 mm) stem 1V3226 35072 1/2-inch (12.7 mm) stem 1V3227 35072 3/4-inch (19.1 mm) stem 1V3260 35072 1-inch (25.4 mm) or 1-1/4 inch (31.8 mm) stem 1V3340 35072		31	Whisper Trim III Cage Retainer for levels A3, B3 & C3 (6-inch Design ED only) 410 stainless steel 22A3255 X012 WCB steel (ENC) 22A3256 X012 316 stainless steel (ENC) 22A3256 X022 316 stainless steel w/Alloy 6 (CoCr-A) bore 22A3257 X012 316 stainless steel (electrolized) 31A9792 X012		32	Whisper Trim III Bonnet Spacer, WCB steel (6-inch Design ED only) 22A3275 X012	
18	Flow Direction Arrow, stainless steel All except Whisper Trim cages 1 or 1-1/4 inch body 1V1059 38982 1-1/2 thru 8-inch bodies 1V1060 38982 Whisper Trim cages 1V4170 38982							
19	Drive Screw, stainless steel (2 req'd) 1A3682 28982							

Key 1 Design ED Valve Body without Drain Plug Tapping, cast iron

Body Size, Inches	Screwed	Class 125 FF	Class 250 RF
1	2R2748 19012	2R2746 19012	2R2747 19012
1-1/4	20A8129 X012	---	---
1-1/2	2R2976 19012	2R2974 19012	2R2975 19012
2	2R3190 19022	2R3188 19012	2R3189 19022
2-1/2	---	2R3763 19012	2R3764 19022
3	---	2R3409 19022	2R3410 19022
4	---	2R3567 19022	2R3568 19022
6	---	2U5030 19022	24A7700 X012
8	---	30A3240 X012	34A7774 X012

Key 1 Design ED Valve Body Without Drain Plug Tapping, WCB steel

Key 1 Design ED Valve Body Without Drain Plug Tapping, WSS Steel						
Body Size, Inches	Screwed		Socket Weld	Schedule 40 Butt Weld	Schedule 80 Butt Weld	
1	2R2712 22012		2R2711 22012	2R2709 22012	2R2710 22012	
1-1/4	20A8126 X012		---	---	---	
1-1/2	2R2940 22012		2R2939 22012	2R2937 22012	2R2938 22012	
2	2R3154 22012		2R3153 22012	2R3151 22012	2R3152 22012	
2-1/2	---		---	2R3735 22012	2R3736 22012	
3	---		---	2R3381 22012	2R3382 22012	
4	---		---	2R3535 22012	2R3536 22012	
6	---		---	2U5010 22012	2U5011 22012	
8	---		---	30A3222 X012	30A3223 X012	
	Class 150		Class 300		Class 600	
	RF	RTJ	RF	RTJ	RF	RTJ
1	2R2703 22012	2R2704 22012	2R2705 22012	2R2708 22012	2R2707 22012	2R2708 22012
1-1/4	---	---	---	---	---	---
1-1/2	2R2931 22012	2R2932 22012	2R2933 22012	2R2934 22012	2R2935 22012	2R2936 22012
2	2R3145 22012	2R3146 22012	2R3147 22012	2R3148 22012	2R3149 22012	2R3150 22012
2-1/2	2R3729 22012	2R3730 22012	2R3731 22012	2R3732 22012	2R3733 22012	2R3734 22012
3	2R3375 22012	2R3376 22012	2R3377 22012	2R3378 22012	2R3379 22012	2R3380 22012
4	2R3527 22012	2R3528 22012	2R3529 22012	2R3530 22012	2R3533 22012	2R3534 22012
6	2U5012 22012	2U5016 22012	2U5013 22012	2U5017 22012	2U5015 22012	2U5019 22012
8	30A3224 X012	30A3227 X012	30A3225 X012	30A3228 X012	30A3226 X012	30A3229 X012

*Recommended spare part.

1. Trademark of International Nickel Co.

Key 1 Design EAD Valve Body, WCB steel

Body Size, Inches	Class 150 RF	Class 300 RF	Class 600 RF	Socket Weld	
1	2U3793 22012	2U3794 22012	2U3795 22012	2U6421 22012	
2	2U3802 22012	2U3803 22012	2U3804 22012	2U6422 22012	
3	2U3811 22012	2U3812 22012	2U3813 22012	---	
4	2U3820 22012	2U3821 22012	2U3823 22012	---	
6	2U3831 22012	2U3832 22012	2U3834 22012	---	
	Schedule 40 Butt Weld	Schedule 80 Butt Weld	Class 150 RTJ	Class 300 RTJ	Class 600 RTJ
	2U3799 22012	2U3800 22012	2U3796 22012	2U3798 22012	2U3798 22012
	2U3808 22012	2U3809 22012	2U3805 22012	2U3806 22012	2U3807 22012
	2U3817 22012	2U3818 22012	2U3814 22012	2U3815 22012	2U3816 22012
	2U3828 22012	2U3829 22012	2U3824 22012	2U3825 22012	2U3827 22012
	2U3839 22012	2U3840 22012	2U3835 22012	2U3836 22012	2U3838 22012

Key 2* Standard Valve Plug

BODY SIZE, INCHES		STEM DIAMETER & VSC SIZE		416 STAINLESS STEEL HARDENED (STD)	316 STAINLESS STEEL ⁽¹⁾	316 STAINLESS STEEL w/CoCr-A ON SEAT ⁽¹⁾	316 STAINLESS STEEL w/CoCr-A ON SEAT & GUIDE ⁽¹⁾	316 STAINLESS STEEL w/CoCr-A ON SEAT & GUIDE HIGH TEMPERATURE ⁽²⁾
Design ED	Design EAD	Inches	mm					
1, 1-1/4 or 1-1/2 x 1	1 or 2 x 1	3/8 1/2	9.5 12.7	1V6571 46172 1V6572 46172	1V6571 35072 1V6572 35072	11A5315 X012 11A5316 X012	11A5317 X012 11A5318 X012	11A5319 X012 11A5320 X012
1-1/2	2	3/8 1/2	9.5 12.7	1V6573 46172 1V6574 46172	1V6573 35072 1V6574 35072	11A5321 X012 10A4439 X012	10A4438 X012 10A4611 X012	11A5322 X012 11A5323 X012
2 or 3 x 2	4 x 2	1/2 3/4	12.7 19.1	1V6575 46172 1V6576 46172	1V6575 35072 1V6576 35072	11A5324 X012 11A5325 X012	11A5326 X012 11A5327 X012	11A5328 X012 11A5329 X012
2 x 1	---	1/2	12.7	1V6572 46172	1V6572 35072	11A5316 X012	11A5318 X012	11A5320 X012
2-1/2 or 4 x 2-1/2	3 or 6 x 2-1/2	1/2 3/4	12.7 19.1	1V6577 46172 1V6578 46172	1V6577 35072 1V6578 35072	11A5330 X012 11A5331 X012	11A5332 X012 11A5333 X012	11A5334 X012 11A5335 X012
2-1/2 x 1-1/2	3 x 1-1/2	1/2	12.7	1V6574 46172	1V6574 35072	10A4439 X012	10A4611 X012	11A5323 X012
3	4	1/2 3/4	12.7 19.1	1V6579 46172 1V6580 46172	1V6579 35072 1V6580 35072	11A5336 X012 10A5104 X012	11A5337 X012 11A5338 X012	11A5339 X012 11A5340 X012
4	6	1/2 3/4 1	12.7 19.1 25.4	1V6581 46172 1V6582 46172 1V6583 46172	1V6581 35072 1V6582 35072 1V6583 35072	11A5341 X012 11A5342 X012 11A5343 X012	11A5344 X012 11A5345 X012 11A5346 X012	11A5347 X012 11A5348 X012 11A5349 X012
6	---	3/4 1 1-1/4	19.1 25.4 31.8	1V6584 46172 1V6585 46172 1V6586 46172	1V6584 35072 1V6585 35072 1V6586 35072	11A5350 X012 10A5107 X012 10A5108 X012	21A5351 X012 20A0103 X012 20A4608 X012	21A5353 X012 21A5354 X012 21A5355 X012
6 x 4	---	3/4	19.1	1V6582 46172	1V6582 35072	11A5342 X012	11A5345 X012	11A5348 X012
8	---	3/4 1 1-1/4	19.1 25.4 31.8	21A5356 X012 21A5357 X012 21A5358 X012	21A5356 X022 21A5357 X022 21A5358 X022	21A5359 X012 21A5360 X012 21A5361 X012	21A5362 X012 21A5363 X012 21A5364 X012	21A5365 X012 21A5366 X012 21A5367 X012

1. Not for use with 17-4PH stainless steel cages above 410°F (210°C) or CoCr-A cages above 800°F (427°C); use high temperature valve plugs for these applications.

2. For use with 17-4PH stainless steel cages between 410°F (210°C) and 800°F (427°C) and with CoCr-A cages over 800°F (427°C) (the letter "H" is stamped on top for identification).

125-600 Designs ED & EAD

Key 2 Whisper Trim III Valve Plug (6-Inch Design ED Only)

STEM DIAMETER & VSC SIZE		17-4PH STAINLESS STEEL (HARDENED)	316 STAINLESS STEEL	316 STAINLESS STEEL w/ CoCr-A ON SEAT	316 STAINLESS STEEL w/ CoCr-A ON SEAT & GUIDE	316 STAINLESS STEEL w/ CoCr-A ON SEAT & GUIDE ⁽¹⁾
Inches	mm					
3/4	19.1	22A3259 X012	22A3259 X022	22A3260 X012	22A3261 X012	22A3267 X012
1	25.4	22A3262 X012	22A3262 X022	22A3263 X012	22A3264 X012	22A3268 X012

1. High temperature.

Key 3 Quick Opening Cage

BODY SIZE, INCHES		17-4PH STAINLESS STEEL (HARDENED)	316 STAINLESS STEEL		CAST IRON (NICKEL COATED)	CoCr-A
Design ED	Design EAD		Chrome Plated	Nickel Coated		
1, 1-1/4, 1-1/2 x 1, or 2 x 1	1 or 2 x 1	2U2150 33272	2U6911 46102	2U7403 48932	2U7403 49242	2U2150 39102
1-1/2 or 2-1/2 x 1-1/2	2 or 3 x 1-1/2	2U2192 33272	2U6918 46102	2U7254 48932	2U7254 49242	2U2192 39102
2 or 3 x 2	4 x 2	2U2234 33272	2U6921 46102	2U7404 48932	20A2713 X012	2U2234 39102
2-1/2 or 4 x 2-1/2	3 or 6 x 2-1/2	2U2276 33272	2U6924 46102	2U7405 48932	20A2714 X012	2U2276 39102
3	4	2U2318 33272	2U6927 46102	2U7406 48932	20A2715 X012	2U2318 39102
4	6	2U2360 33272	2U6930 46102	2U7407 48932	20A2716 X012	2U2360 39102
6	---	2U5063 33272	2U6935 46102	2U8069 48932	2U8069 49242	2U5063 39102
6 x 4	---	2V3722 33272	2V3717 46102	2V3714 48932	---	2V3722 39102
8	---	20A3249 X012	20A4350 X012	20A5469 X012	---	20A3249 X092

Key 3 Linear Cage

BODY SIZE, INCHES		17-4PH STAINLESS STEEL (HARDENED)	316 STAINLESS STEEL		CoCr-A
Design ED	Design EAD		Chrome Plated	Nickel Coated	
1, 1-1/4, 1-1/2 x 1, or 2 x 1	1 or 2 x 1	2U2156 33272	2U6917 46102	2U7414 48932	2U2156 39102
1-1/2, or 2-1/2 x 1-1/2	2 or 3 x 1-1/2	2U2198 33272	2U6920 46102	2U7415 48932	2U2198 39102
2 or 3 x 2	4 x 2	2U2240 33272	2U6923 46102	2U7416 48932	2U2240 39102
2-1/2 or 4 x 2-1/2	3 or 6 x 2-1/2	2U2282 33272	2U6926 46102	2U7417 48932	2U2282 39102
3	4	2U2324 33272	2U6929 46102	2U7418 48932	2U2324 39102
4	6	2U2366 33272	2U6933 46102	2U7419 48932	2U2366 39102
6	---	2U5061 33272	2U6938 46102	2U8068 48932	2U5061 39102
6 x 4	---	2V3718 33272	2V3715 46102	2V3712 48932	2V3718 39102
8	---	20A3247 X012	20A4349 X012	20A5468 X012	20A3247 X092

Key 3 Equal Percentage Cage

BODY SIZE, INCHES		17-4PH STAINLESS STEEL (HARDENED)	316 STAINLESS STEEL		CAST IRON (NICKEL COATED)	CoCr-A
Design ED	Design EAD		Chrome Plated	Nickel Coated		
1, 1-1/4, 1-1/2 x 1, or 2 x 1	1 or 2 x 1	2U2153 33272	2U6913 46102	2U7408 48932	2U7408 X0012	2U2153 39102
1-1/2 or 2-1/2 x 1-1/2	2 or 3 x 1-1/2	2U2195 33272	2U6919 46102	2U7409 48932	2U7409 X0012	2U2195 39102
2 or 3 x 2	4 x 2	2U2237 33272	2U6922 46102	2U7410 48932	2U7410 X0012	2U2237 39102
2-1/2 or 4 x 2-1/2	3 or 6 x 2-1/2	2U2279 33272	2U6925 46102	2U7411 48932	2U7411 X0012	2U2279 39102
3	4	2U2321 33272	2U6928 46102	2U7412 48932	2U7412 X0012	2U2321 39102
4	6	2U2363 33272	2U6931 46102	4U7413 48932	2U7413 X0012	2U2363 39102
6	---	2U5059 33272	2U6937 46102	2U8067 48932	2U8067 X0012	2U5059 39102
6 x 4	---	2V3723 33272	2V3716 46102	2V3713 48932	---	2V3723 39102
8	---	20A3245 X012	20A4348 X012	20A5467 X012	---	20A3445 X092

Key 3 Whisper Trim I Cage, 17-4PH stainless steel (hardened)

BODY SIZE, INCHES		PART NUMBER
Design ED	Design EAD	
1, 1-1/4, 1-1/2 x 1, or 2 x 1	1 or 2 x 1	2V5023 33272
1-1/2 or 2-1/2 x 1-1/2	2 or 3 x 1-1/2	2V5024 33272
2 or 3 x 2	4 x 2	2V5025 33272
2-1/2 or 4 x 2-1/2	3 or 6 x 2-1/2	2V5026 33272
3	4	2V5027 33272
4	6	2V5028 33272
6	---	2V5029 33272

Key 3 Whisper Trim III Cage (6-Inch Design ED only)

Level	416 Stainless Steel	316 Stainless Steel (Nickel Coated)	316 Stainless Steel (Electrolized)
A3	32A3248 X012	32A3251 X012	32A3336 X012
B3	32A3249 X012	32A3252 X012	32A3337 X012
C3	32A3250 X012	32A3253 X012	32A3338 X012
D3	32A6217 X012	32A6220 X012	32A6741 X012

Key 4 and 5 Trim Adaptors, steel (restricted-capacity sizes only)

BODY SIZE, INCHES		KEY 4 CAGE ADAPTOR	KEY 5 SEAT RING ADAPTOR
Design ED	Design EAD		
1-1/2 x 1	2 x 1	1U2218 24492	---
2 x 1	---	1U1207 24492	1U2262 24492
2-1/2 x 1-1/2	3 x 1-1/2	1U2302 24492	1U2304 24492
3 x 2	4 x 2	1U1246 22012	1U2346 22012
4 x 2-1/2	6 x 2-1/2	1U1251 22012	1U2396 22012

Key 6* Standard Piston Ring

BODY SIZE, INCHES		TO 450°F (232°C) CARBON-FILLED TFE	450 TO 600°F (232 TO 316°C) GRAPHITE	601 TO 900°F (316 TO 482°C) GRAPHITE	901 TO 1100°F (482 TO 593°C) GRAPHITE
Design ED	Design EAD				
1, 1-1/4, 1-1/2 x 1, or 2 x 1	1 or 2 x 1	1U2173 05092	1U2174 05102	1U2174 X0012	1U2174 X0022
1-1/2 or 2-1/2 x 1-1/2	2 or 3 x 1-1/2	1U2215 05092	1U2216 05102	1U2216 X0012	1U2216 X0022
2 or 3 x 2	4 x 2	1U2257 05092	1U2258 05102	1U2258 X0012	1U2258 X0022
2-1/2 or 4 x 2-1/2	3 or 6 x 2-1/2	1U2299 05092	1U2300 05102	1U2300 X0012	1U2300 X0022
3	4	1U2341 05092	1U2342 05102	1U2342 X0012	1U2342 X0022
4 or 6 x 4	6	1U2391 05092	1U2392 05102	1U2392 X0012	1U2394 X0022
6	---	1U5068 05092	1U5069 05102	1U5069 X0012	1U5069 X0022
8	---	---	10A3262 X012	10A3262 X022	10A3262 X032

Key 6* Whisper Trim III Piston Ring (6-Inch Design ED only)

CARBON-FILLED TFE TO 450°F (232°C)	GRAPHITE FOR OVER 450°F (232°C)		
	450 to 600°F (232 to 316°C)	601 to 900°F (316 to 482°C)	901 to 1100°F (482 to 593°C)
13A4886 X012	11A9727 X012	11A9727 X022	11A9727 X032

*Recommended spare part.

Key 7* Design ED Valve Plug Stem, 316 stainless steel (not for Whisper Trim III cage)

BODY SIZE, INCHES		STEM DIAMETER & VSC SIZE		PLAIN BONNET			EXTENSION BONNET					
				Stem Length		Part Number	Style 1			Style 2		
							Stem Length		Part Number	Stem Length		Part Number
		Inches	mm	Inches	mm		Inches	mm		Inches	mm	
Full Capacity	1, 1-1/4, or 1-1/2	3/8 1/2	9.5 12.7	8-7/8 11-13/16	225 300	1U3888 35162 1U3890 35162	12-1/4 15-13/16	311 402	1U2177 35162 1U2179 35162	15-15/16 18-5/8	405 473	10A8823 X022 1U2180 35162
	2	1/2 3/4	12.7 19.1	12-1/4 14-5/8	311 372	1K5869 35162 1U2265 35162	16-1/4 19	413 483	1U2263 35162 1L4001 35162	24-3/16 ---	614 ---	1U2264 35162 ---
	2-1/2 or 3	1/2 3/4	12.7 19.1	12-5/8 15	321 381	1U2305 35162 1U2308 35162	16-9/16 19-3/4	421 502	1U2306 35162 1U4446 35162	24-9/16 ---	624 ---	1U2307 35162 ---
	4	1/2 3/4 1 ⁽¹⁾ 1 ⁽²⁾	12.7 19.1 25.4 ⁽¹⁾ 25.4 ⁽²⁾	12-5/8 15-1/2 18-1/4 19-1/4	321 394 464 489	1U2305 35162 1K5877 35162 1K7590 35162 1U2175 35162	16-9/16 19-3/4 --- ---	421 502 --- ---	1U2306 35162 1U4446 35162 --- ---	24-9/16 27-5/16 --- ---	624 694 --- ---	1U2307 35162 1U2400 35162 --- ---
	6	3/4 1 1-1/4	19.1 25.4 31.8	15-7/8 19-5/8 20	403 499 508	1L9964 35162 1N7047 35162 1K4154 35162	20-1/8 24-13/16 25-13/16	511 630 656	1U5071 35162 1K7851 35162 1R5624 35162	27-1/2 --- ---	699 --- ---	1U5244 35162 --- ---
	8	3/4 1 1-1/4	19.1 25.4 31.8	19-3/8 24-3/16 27-7/16	492 614 705	1K5880 35162 1K7891 X0012 1L2688 35162	21 24-3/16 29-7/16	533 614 705	1U9282 35162 1K7891 X0012 1L2688 35162	--- --- ---	--- --- ---	--- --- ---
Restricted Capacity	1-1/2 x 1	3/8 1/2	9.5 12.7	9-3/8 12-1/4	241 311	1U2236 35162 1K5869 35162	12-3/4 16-1/4	324 413	1U2270 35162 1U2263 35162	16-7/16 19-1/8	418 486	1U2272 35162 1U2273 35162
	2 x 1 or 2-1/2 x 1-1/2	1/2	12.7	11-13/16	300	1U3890 35162	15-13/16	402	1U2179 35162	23-13/16	605	1U3893 X0012
	3 x 2	1/2 3/4	12.7 19.1	12-1/4 14-5/8	311 372	1K5869 35162 1U2265 35162	16-1/4 19	413 483	1U2263 35162 1L4001 35162	24-3/16 ---	614 ---	1U2264 35162 ---
	4 x 2-1/2	1/2 3/4	12.7 19.1	12-5/8 15	321 381	1U2305 35162 1U2308 35162	16-9/16 19-3/4	421 502	1U2306 35162 1U4446 35162	24-9/16 26-13/16	624 681	1U2307 35162 1U2323 35162
	6 x 4	3/4	19.1	15-7/8	403	1L9964 35162	20-1/8	511	1U5071 35162	27-1/2	699	1U5244 35162
1. Type 667 actuator. 2. Type 657 or 470 Series actuator.												

Key 7* Whisper Trim III Valve Plug Stem, 316 stainless steel (6-Inch Design ED only)

STEM DIA. & VSC SIZE		PLAIN BONNET	EXTENSION BONNET	
Inches	mm		Style 1	Style 2
3/4	19.1	1U3416 35162	1U9282 35162	1U6276 X0012
1	25.4	1P8476 35162	1U6277 35162	---

125-600 Designs ED & EAD

Key 7* Design EAD Valve Plug Stem for Plain and Extension Bonnets

BODY SIZE, INCHES		STEM DIAMETER & VSC SIZE		PLAIN BONNET			EXTENSION BONNET					
				Stem Length		Part Number	Style 1			Style 2		
							Stem Length		Part	Stem Length		Part
		Inches	mm	Inches	mm		Inches	mm	Number	Inches	mm	Number
Full Capacity	1 or 2	3/8	9.5	8-7/8	225	1U3888 35162	12-1/4	311	1U2177 35162	15-15/16	405	1U2178 35162
		1/2	12.7	11-13/16	300	1U3890 35162	15-13/16	402	1U2179 35162	18-5/8	473	1U2180 35162
	3 or 4	1/2	12.7	12-5/8	321	1U2305 35162	16-9/16	421	1U2306 35162	24-9/16	624	1U2307 35162
		3/4	19.1	15	381	1U2308 35162	19-3/4	502	1U4446 35162	---	---	---
	6	1/2	12.7	12-5/8	321	1U2305 35162	16-9/16	421	1U2306 35162	24-9/16	624	1U2307 35162
		3/4	19.1	15-1/2	394	1K5877 35162	19-3/4	502	1U4446 35162	27-5/16	694	1U2400 35162
		1 ⁽¹⁾	25.4 ⁽¹⁾	18-1/4	464	1K7590 35162	---	---	---	---	---	---
		1 ⁽²⁾	25.4 ⁽²⁾	19-1/4	489	1U2175 35162	---	---	---	---	---	---
Restricted Capacity	2 x 1	3/8	9.5	9-3/8	238	1U2236 35162	12-3/4	324	1U2270 35162	16-7/16	418	1U2272 35162
		1/2	12.7	12-1/4	311	1K5869 35162	16-1/4	413	1U2263 35162	19-1/8	486	1U2273 35162
	3 x 1-1/2	1/2	12.7	11-13/16	300	1U3890 35162	15-13/16	402	1U2179 35162	23-13/16	605	1U3893 X0012
	4 x 2	1/2	12.7	12-1/4	311	1K5869 35162	16-1/4	413	1U2263 35162	24-3/16	614	1U2264 35162
		3/4	19.1	14-5/8	372	1U2265 35162	19	483	1L4001 35162	---	---	---
	6 x 2-1/2	1/2	12.7	12-5/8	321	1U2305 35162	16-9/16	421	1U2306 35162	24-9/16	624	1U2307 35162
		3/4	19.1	15	381	1U2308 35162	19-3/4	502	1U4446 35162	26-13/16	681	1U2323 35162
	1. Type 667 actuator. 2. Type 657 or 470 Series actuator.											

Key 7* Valve Plug Stem for Bellows Seal Bonnet, 316 stainless steel

BODY SIZE, INCHES		STEM DIAMETER & VSC SIZE		STEM LENGTH		PART NUMBER
Design ED	Design EAD	Inches	mm	Inches	mm	
1/2, 3/4, 1, 1-1/4, 1-1/2, or 1-1/2 x 1	1, 2, or 2 x 1	3/8 1/2	9.5 12.7	8-3/4 11-1/4	222 286	1R2885 35162 1R2888 35162
2, 2-1/2, 2-1/2 x 1-1/2, or 3	3 or 4	1/2	12.7	12-3/8	314	1U3892 35162
---	3 x 1-1/2	1/2	12.7	11-5/8	295	1U3889 35162
2 x 1 or 3 x 2	4 x 2	1/2	12.7	12	305	1U3891 35162
4	6	1/2 3/4	12.7 19.1	12-7/8 15-1/4	327 387	2R3693 35162 1K5876 35162
4 x 2-1/2	6 x 2-1/2	1/2 3/4	12.7 19.1	12-7/8 14-3/4	327 375	2R3693 35072 1U3894 35162
6 or 6 x 4	---	3/4	19.1	15-1/4	387	1K5876 35162

Key 9* Seat Ring (not for Whisper Trim III cage)

BODY SIZE, INCHES		416 STAINLESS STEEL (HARDENED)	316 STAINLESS STEEL	CoCr-A
Design ED	Design EAD			
1, 1-1/4 or 2 x 1	1	1U2225 46172	1U2225 35072	1U2225 39102
1-1/2 x 1	2 x 1	1U2220 46172	1U2220 35072	1U2220 39102
1-1/2 or 2-1/2 x 1-1/2	2 or 3 x 1-1/2	1U2219 46172	1U2219 35072	1U2219 39102
2 or 3 x 2	4 x 2	1U2226 46172	1U2226 35072	1U2226 39102
2-1/2 or 4 x 2-1/2	3 or 6 x 2-1/2	1U2227 46172	1U2227 35072	1U2227 39102
3	4	1U2228 46172	1U2228 35072	1U2228 39102
4	6	1U2229 46172	1U2229 33092	1U2229 39102
6	---	1U5080 46172	1U5080 33092	1U5080 39102
6 x 4	---	2V3719 46192	2V2719 35072	2V3720 46052
8	---	20A3260 X012	20A3260 X022	20A3260 X152

Key 9* Design EAD Liner

Liner Material	Body Size, Inches	Class 150 RF Body	Class 300 RF Body	Class 600 RF Body	Socket Weld Body	Schedule 40 or 80 Butt Weld Body
416 stainless steel (hardened)	1	1V5601 46172	1U3842 46172	1V5602 46172	1V5601 46172	1V5601 46172
	2	1V5603 46172	1U3843 46172	1V5605 46172	1V5603 46172	1V5603 46172
	2 x 1	1V5606 46172	1U3851 46172	1V3876 46172	1V5606 46172	1V5606 46172
	3	2V5613 46172	2U3845 46172	2V5616 46172	---	2V5613 46172
	3 x 1-1/2	2V5609 46172	2U3853 46172	2V5459 46172	---	2V5609 46172
	4	2V5622 46172	2U3847 46172	2V5619 46172	---	2V5622 46172
	4 x 2	2V5618 46172	2U3855 46172	2V5612 46172	---	2V5618 46172
	6	2V5631 46172	2U3849 46172	2V5628 46172	---	2U3849 46172
316 stainless steel	6 x 2-1/2	2V5626 46172	2U3857 46172	2V5623 46172	---	2U3857 46172
	1	1V5601 35072	1U3842 35072	1V5602 35072	1V5601 35072	1V5601 35072
	2	1V5603 35072	1U3843 35072	1V5605 35072	1V5603 35072	1V5603 35072
	2 x 1	1V5606 35072	1U3851 35072	1V3876 35072	1V5606 35072	1V5606 35072
	3	2V5613 35072	2U3845 35072	2V5616 35072	---	2V5613 35072
	3 x 1-1/2	2V5609 35072	2U3853 35072	2V5459 35072	---	2V5609 35072
	4	2V5622 35072	2U3847 35072	2V5619 35072	---	2V5622 35072
	4 x 2	2V5618 35072	2U3855 35072	2V5612 35072	---	2V5618 35072
	6	2V5631 35072	2U3849 35072	2V5628 35072	---	2U3849 35072
	6 x 2-1/2	2V5626 35072	2U3857 35072	2V5623 35072	---	2U3857 35072

Key 9* Whisper Trim III Seat Ring (6-Inch Design ED only)

410 SST	316 SST	316 SST w/ CoCr-A
21A9794 X012	21A9794 X022	21A9795 X012

Gasket Descriptions

KEY NUMBER	DESCRIPTION	MATERIAL	
		To 450°F (232°C) Except to 300°F (149°C) for Cycling Service or to 800°F (427°C) for 8-Inch Design ED	Over 450°F (232°C) Except Over 300°F (149°C) for Cycling Service
10	Bonnet gasket	1-1/2 x 1 or 2 x 1 Design ED or 2 x 1 Design EAD	FGM
		All other sizes	Asbestos
11	Cage gasket	1-1/2 x 1 or 2 x 1 Design ED or 2 x 1 Design EAD	FGM
		All other restricted capacity sizes	Asbestos
		Full capacity sizes	Asbestos
12	Spiral wound gasket	Full capacity sizes	316L SST & asbestos
		Restricted capacity sizes	Inconel ⁽¹⁾ 600 & laminated graphite
13	Seat ring or liner gasket	1-1/2 x 1 or 2 x 1 Design ED or 2 x 1 Design EAD	FGM
		All other sizes	Asbestos
14	Adaptor gasket (not used with full capacity sizes)	1-1/2 x 1 or 2 x 1 Design ED or 2 x 1 Design EAD	FGM
		All other restricted capacity sizes	Asbestos
27	Shim (Design EAD only)	1-1/2 x 1 or 2 x 1 Design ED or 2 x 1 Design EAD ⁽²⁾	SST
51	Shim (Design ED only)		

1. Trademark of International Nickel Co.

2. Shim not used on full capacity sizes up to 450°F (232°C).

Keys 10*, 11*, 12*, 13*, 14*, 27 and 51 Gaskets and Shims

Body Size, Inches		Key Number	To 450°F (232°C) Except to 300°F (149°C) for Cycling Service or to 800°F (427°C) for 8-Inch Design ED	Over 450°F (232°C) Except Over 300°F (149°C) for Cycling Service or to 1100°F (593°C) for 8-Inch Design ED	Body Size, Inches		Key Number	To 450°F (232°C) Except to 300°F (149°C) for Cycling Service or to 800°F (427°C) for 8-Inch Design ED	Over 450°F (232°C) Except Over 300°F (149°C) for Cycling Service or to 1100°F (593°C) for 8-Inch Design ED
Design ED	Design EAD				Design ED	Design EAD			
1 or 1-1/4	1	Set ⁽¹⁾ 10 11 12 13 27 or 51	1R2860 X0012 1R2859 04022 1R2861 04022 1R2860 99282 1R2862 04022 ---	1R2860 X0262 1R2859 X0042 --- 1R2860 99442 1R2862 X0062 16A1936 X012	3	4	Set ⁽¹⁾ 10 11 12 13 27 or 51	1R3482 X0012 1R3484 04022 1R3483 04022 1R3482 99282 1R3481 04022 ---	1R3482 X0112 1R3484 X0042 --- 1R3482 99442 1R3481 X0052 16A1940 X012
1-1/2	2	Set ⁽¹⁾ 10 11 12 13 27 or 51	1R3099 X0012 1R3101 04022 1R3100 04022 1R3099 99282 1R3098 04022 ---	1R3099 X0242 1R3101 X0032 --- 1R3099 99442 1R3098 X0052 16A1937 X012	3 x 2	4 x 2	Set ⁽¹⁾ 10 11 (2 req'd) 12 13 14 27 or 51	1R3297 X0132 ⁽²⁾ 1R3484 04022 1R3298 04022 1R3297 99442 1R3296 04022 1R3481 04022 ---	1R3297 X0232 1R3484 X0042 1R3298 X0032 1R3297 99442 1R3296 X0042 1R3481 X0052 16A1938 X012
1-1/2 x 1	2 x 1	Set ⁽¹⁾ 10 11 12 13 20 27 or 51	1R2860 X0272 1R3101 X0032 1R2861 X0042 1R2860 99442 1R3098 X0052 1U2152 X0042 16A1936 X012	1R2860 X0272 1R3101 X0032 1R2861 X0042 1R2860 99442 1R3098 X0052 1U2152 X0042 16A1936 X012	4	6	Set ⁽¹⁾ 10 11 12 13 27 or 51	1R3722 X0012 1R3724 04022 1R3723 04022 1R3722 99282 1J5047 04022 ---	1R3722 X0142 1R3724 X0042 --- 1R3722 99442 1J5047 X0062 16A1941 X012
2	---	Set 10 11 12 13 51	1R3297 X0012 1R3299 04022 1R3298 04022 1R3297 99282 1R3296 04022 ---	1R3297 X0222 1R3299 X0042 --- 1R3297 99442 1R3296 X0042 16A1938 X012	4 x 2-1/2	6 x 2-1/2	Set ⁽¹⁾ 10 11 (2 req'd) 12 13 14 27 or 51	1R3845 X0122 ⁽²⁾ 1R3724 04022 1R3846 04022 1R3845 99442 1R3844 04022 1J5047 04022 ---	1R3845 X0182 1R3724 X0042 1R3846 X0042 1R3845 99442 1R3844 X0052 1J5047 X0062 16A1939 X012
2 x 1	---	Set 10 11 12 13 14 51	1R2860 X0282 1R3299 X0042 1R2861 X0042 1R2860 99442 1R2862 X0062 1R3296 X0042 16A1936 X012	1R2860 X0282 1R3299 X0042 1R2861 X0042 1R2860 99442 1R2862 X0062 1R3296 X0042 16A1936 X012	6	---	Set ⁽³⁾ 10 11 12 13 51	1U5085 X0012 1U5081 04022 1U5083 04022 1U5085 99282 1U5086 04022 ---	1U5085 X0222 1U5081 X0052 --- 1U5085 99442 1U5086 X0032 16A1942 X012
2-1/2	3	Set ⁽¹⁾ 10 11 12 13 27 or 51	1R3845 X0012 1R3847 04022 1R3846 04022 1R3845 99282 1R3844 04022 ---	1R3845 X0172 1R3847 X0032 --- 1R3845 99442 1R3844 X0052 16A1939 X012	6 x 4	---	Set 10 11 12 13 51	1U5085 X0112 1U5081 04022 1U5083 04022 1U5085 99442 1U5086 04022 ---	1U5085 X0222 1U5081 X0052 --- 1U5085 99442 1U5086 X0032 16A1942 X012
2-1/2 x 1-1/2	3 x 1-1/2	Set ⁽¹⁾ 10 11 12 13 14 27 or 51	1R3099 X0132 1R3847 04022 1R3100 04022 1R3099 99442 1R3098 04022 1R3844 04022 ---	1R3099 X0252 1R3847 X0032 1R3100 X0032 1R3099 99442 1R3098 X0052 1R3844 X0052 16A1937 X012	8	---	Set 10 13	10A3265 X042 10A3265 X012 10A3266 X012	10A3265 X052 10A3265 X022 10A3266 X022

1. Set number good for both Design ED and EAD body.
 2. Set includes 2 cage gaskets (key 11).

3. Whisper Trim III construction requires 2 bonnet gaskets (key 10) so order a set plus 1 extra bonnet gasket for that construction.

Key 15 Cap Screw, Grade 5 pl steel
Key 15 Stud, SA 193-B7 steel
Key 16 Nut, SA 194-2H steel

Construction	Body Size, Inches		Number Req'd	Iron Body	Steel Body			
				Key 15, Cap Screw (Plain Bonnet Only)	Key 15, Stud		Key 16 Nut	
	Design ED	Design EAD			Plain or Standard Extension Bonnet	Bellows Seal Extension Bonnet	Nonlubricated	Factory Prelubricated
All except Whisper Trim III cage	1 or 1-1/4	1	4	1R2811 24052	1R2848 31012	1R3873 31012	1C3306 24072	1C3306 X0242
	1-1/2	2	8	1A4533 24052	1K2429 31012	1A45960 X012	1A3772 24072	1A3772 X0242
	1-1/2 x 1	2 x 1	8	1A3616 24052	1P5682 X00A2	1U2351 31012	1A3772 24072	1A3772 X0242
	2 or 2 x 1	---	8	1A4533 24052	1K2429 31012	1P5823 31012	1A3772 24072	1A3772 X0242
	2-1/2 or 2-1/2 x 1-1/2	3 or 3 x 1-1/2	8	1R2811 24052	1R2848 31012	1A45961 X012	1C3306 24072	1C3306 X0242
	3 or 3 x 2	4 or 4 x 2	8	1A4541 24052	1A3781 31012	1A45962 X012	1A3760 24072	1A3760 X0192
	4 or 4 x 2-1/2	6 or 6 x 2-1/2	8	1A4402 24052	1R3690 31012	1N6604 X0012	1A3520 24072	1A3520 X0172
	6 or 6 x 4	---	12	1U5131 24052	1A3656 31012	1U5088 31012	1A4409 24072	1A4409 X0222
	8	---	16	10A3250 X012	1D9452 31012	1D9452 31012	1A4452 24072	---
Whisper Trim III cage	6	---	12	---	12A3277 X012	---	1A4409 24072	---

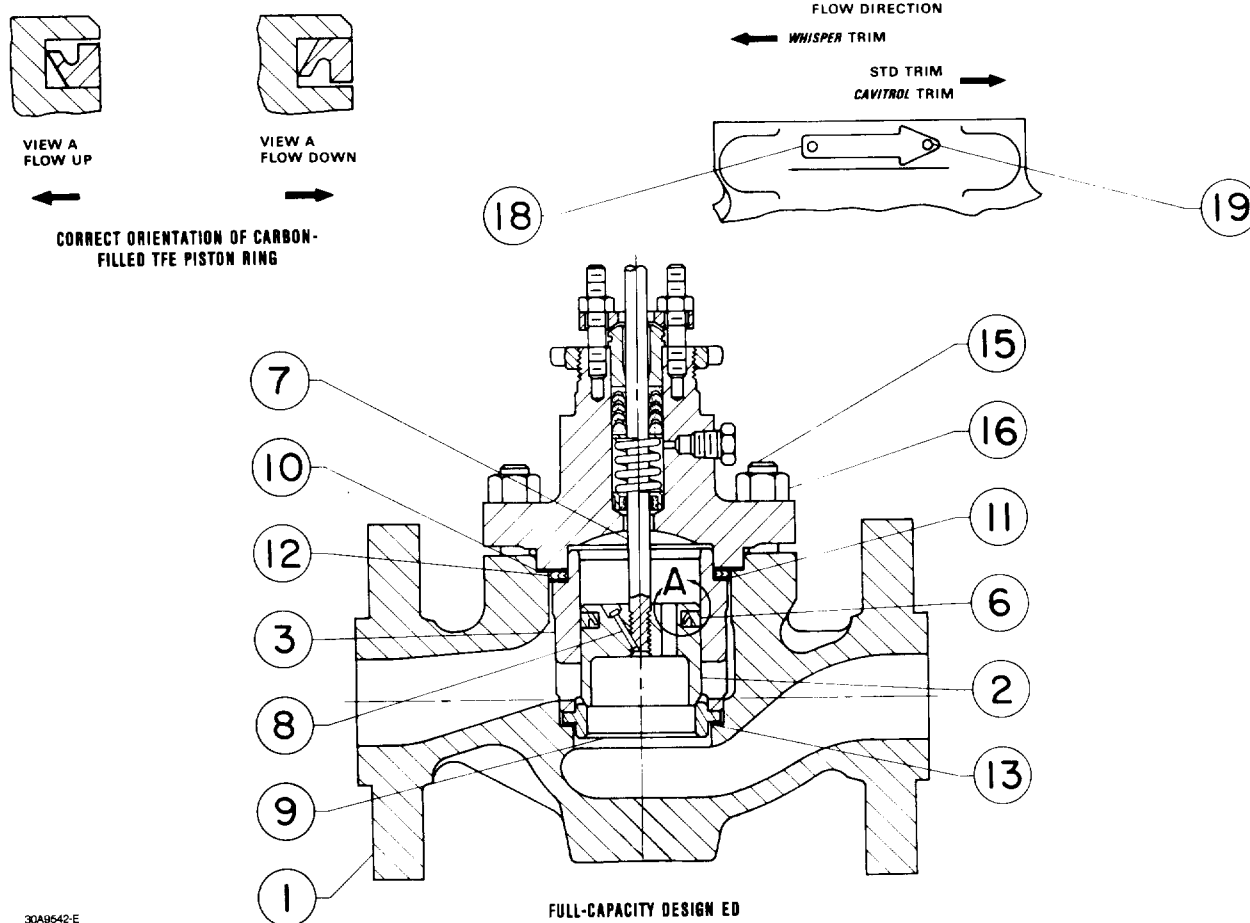


Figure 6. Standard 1- Through 6-Inch Design ED, and EAD, Body Assemblies

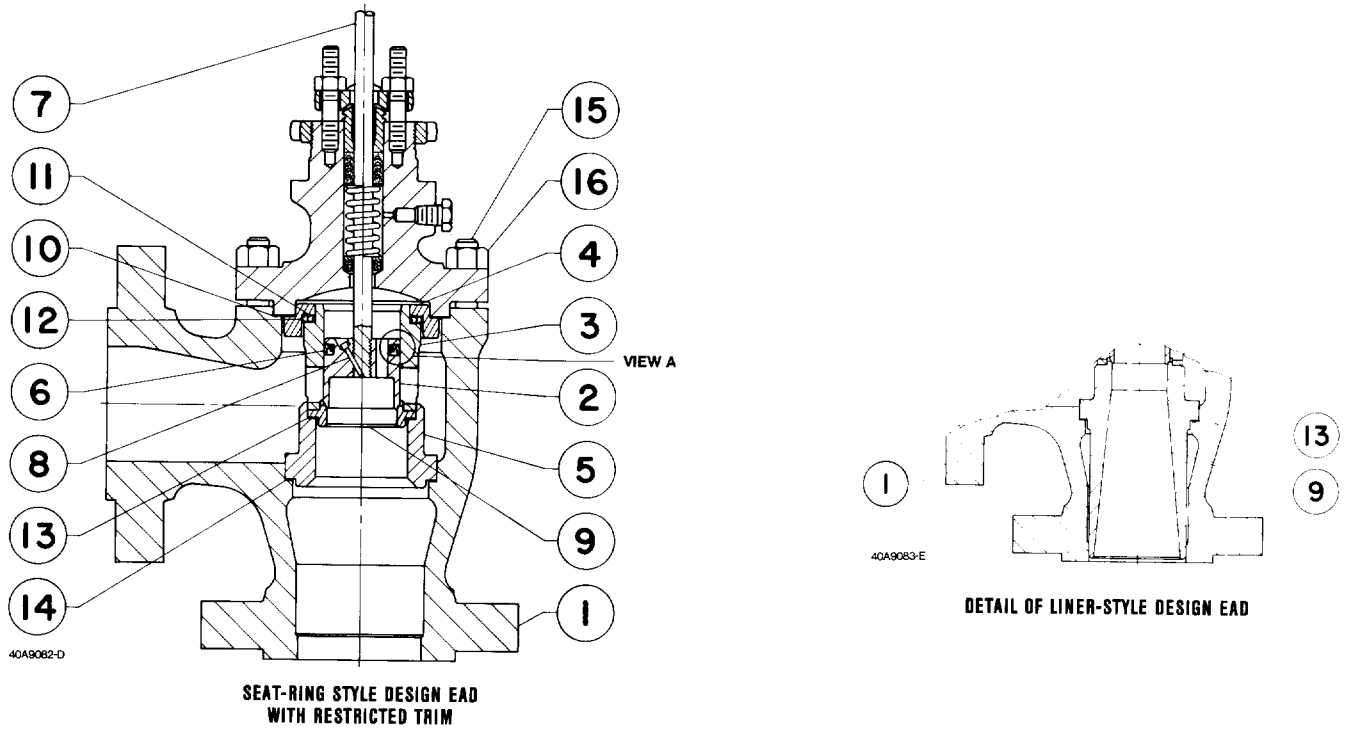


Figure 6. Standard 1- Through 6-Inch Design ED,
and EAD, Body Assemblies (Continued)

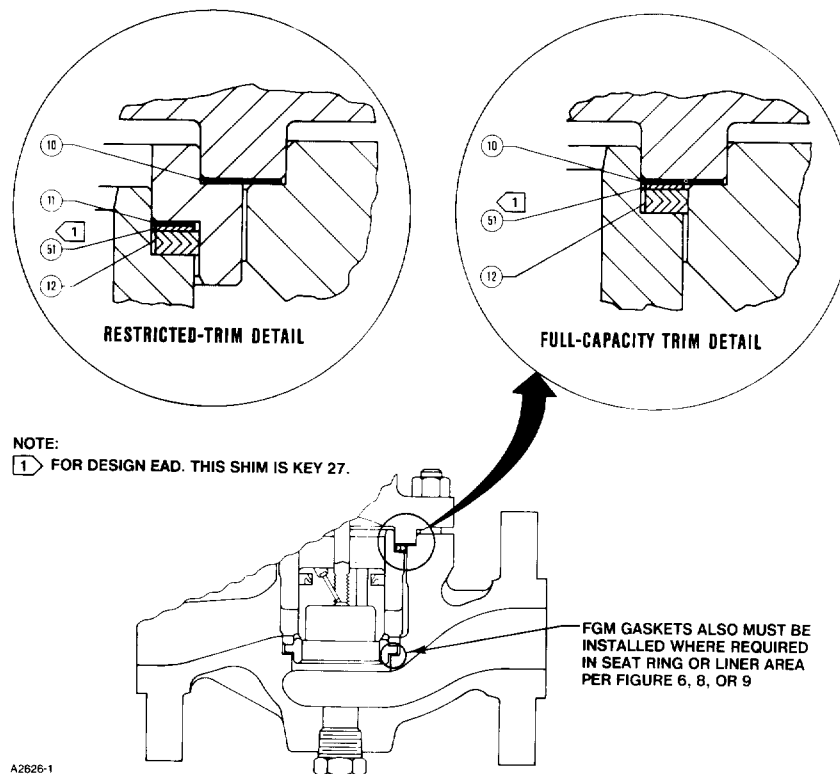
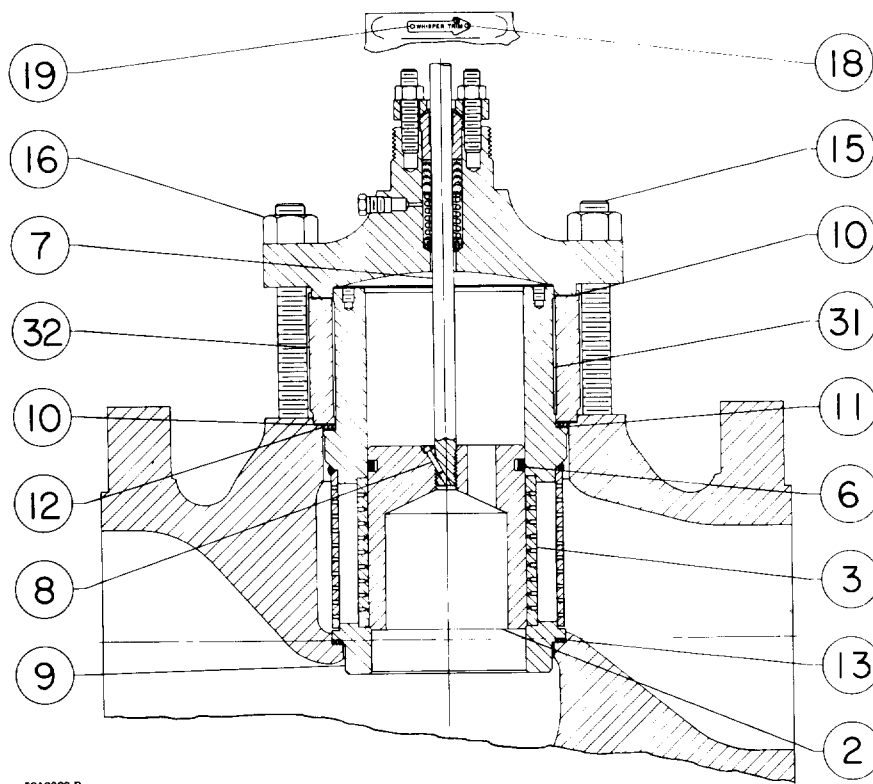
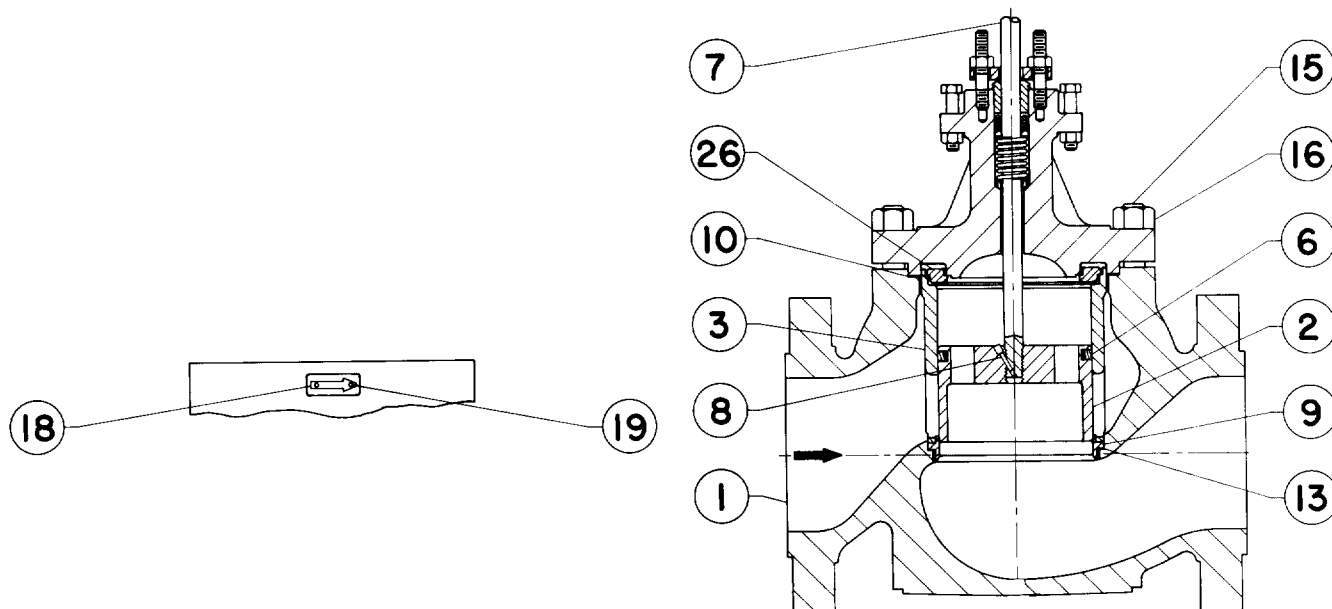


Figure 7. FGM Gasket Set Detail



52A3326-B

Figure 8. Whisper Trim III Detail



40A3290-D

Figure 9. 8-Inch Design ED Body with Graphite Piston Ring

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